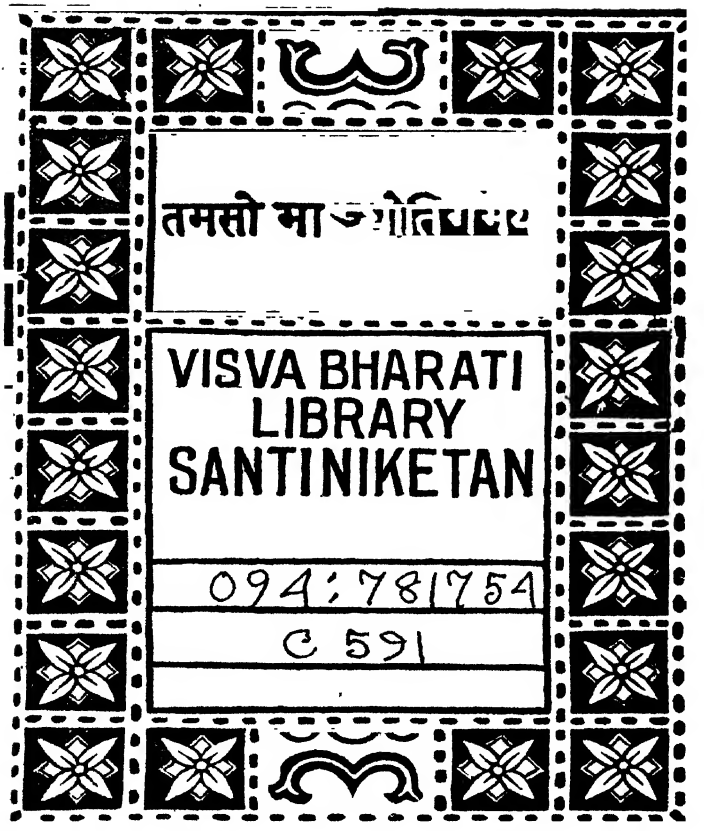

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# INTRODUCTION TO THE STUDY OF INDIAN MUSIC

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# STUDY OF INDIAN MUSIC

AN ATTEMPT TO RECONCILE MODERN HINDUSTANI MUSIC WITH ANCIENT MUSICAL THEORY AND TO PROPOUND AN ACCURATE AND COMPREHENSIVE METHOD OF TREATMENT OF THE SUBJECT OF INDIAN MUSICAL INTONATION

BY

E. CLEMENTS

OF THE INDIAN CIVIL SERVICE, BOMBAY PRESIDENCY

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# FOREWORD

THE time is perhaps far distant when it will be possible to write a connected history of Indian music, tracing its origins, development, and old age. It is clear, however, that its golden age—that period so short in the history of any art cycle, and so prepotent in determining the modes of both art and life for long subsequent periods—must lie far back from the present. Not improbably, that golden age coincided with the moment of greatest achievement in drama, Kalidasa, and for the theory, Bharata. Long anterior to this, however, music was a most highly cultivated—perhaps the most highly cultivated—of Indian arts, and to the present day it has remained the most continuously vital and most universally appreciated art of India. Taking together what has been lost, and what remains, music is, then, the most complete expression of the soul or genius of the Indians—a mirror faithfully reflecting their inner life. That English Orientalists and educationists have so long ignored this music, is the measure of their misunderstanding of India.

While it is true that, until modern times, music has remained in the best sense one of the most popular of Indian arts, it is also true, though with exceptions, that it has been neglected and despised, for example, by Aurangzeb, as well as by more modern puritans. But the music remained too intimately associated with religion, with the drama, and with life, whether courtly or popular, and was too faithfully guarded by the traditions of the guilds for it to be possible that it should die out altogether. There are to be found even now, for the most part at the courts of Indian rajas, or in specially musical towns like Lucknow, Tanjore, and Poona, a few ustads who are artists of high, and even of supreme rank; but they belong to an order that is passing away.

The neglect of centuries, as in so many analogous cases, has proved less disastrous than the renewed patronage of a few decades. The constant use of the tempered harmonium; the endeavour to adapt Indian modes to the purposes of tenth or fifteenth-rate brass bands maintained by Indian rajas; the absence of any æsthetic element in modern Indian education; the mania for English accomplishments: all these causes have actively contributed to the degeneration of Indian music. By degeneration, I mean literally confusion, a running together, and destruction of bounding-lines; a process quite distinct from any natural waning of vitality at the latter end of an art cycle.

Now that life has changed, so that the old music, however splendid, no longer expresses race-intention (we are no longer united by such an intention), there are two considerations that must weigh with us, when we think of Indian music; to maintain the memory of our past experience, as an interpretation and inspiration and delight, and to clear the way for new creators. For both these ends it is necessary to escape from the confusion into which the theoretical part of Indian music has unfortunately fallen. It is here, I think, that Mr. Deval has done great service in applying a purely experimental method to the analysis of the actual intonation of thoroughly trustworthy hereditary musicians. Mr. Deval's work, the results of which are published in his "Hindu Musical Scale and the Twenty-two Srutees," deserves the highest praise. It is true that Mr. Deval did not succeed in his endeavour to improve his case by importing aid and corroboration from scientific acoustics and Sanskrit philology; but I think that certain of his critics fall into more serious error when they judge the results of his patient and invaluable experimental work by weakness or inaccuracies in his method of presentation.

The preparation of the sruti harmonium, and the presentation of the general results of Mr. Deval's work, combined with a critical discussion of the theory of music according to Bharata and Sârangdev in Mr. Clements' most interesting book, mark, I think, an epoch in the scientific study of Indian music. It will at any rate be possible for future writers, even when they disagree with Mr. Clements, to say more clearly

and definitely than heretofore, what they exactly mean; and still more important, for future recorders to make a nearer approach to a true transcription of the Indian râgas. I cannot but hope that Mr. Clements will himself extend his studies in this direction. It may be a long time before we have as full and as exact a knowledge of Indian music as we have of Indian literature; but if that time ever comes, it will, I am sure, be acknowledged that the work of Mr. Deval and Mr. Clements did much to clear the way for such a development of knowledge.

I should like to say a word of warning with regard to the sruti harmonium. This instrument is to be welcomed, in any case, as infinitely preferable, from the standpoint of intonation, to the tempered harmonium now in common use. It is a valuable tool, and may be used for purposes of research, and also for class teaching, where the instruction of large classes (a process foreign to the Indian conception of educational method) is unavoidable. Thus used, the sruti harmonium will serve the ends of exact knowledge, and will not (as the tempered harmonium now does) destroy the sensitiveness of the Indian ear to those "hair's-breadth" distinctions which are essential to a highly evolved art of pure melody. But, as I think, no harmonium of any kind should ever be regarded as a *substitute* for the tambura, because the quality of tone of the tambura is so infinitely superior to that of the harmonium, to say nothing of other æsthetic and social considerations; above all, the harmonium should never be used as an accompaniment to the voice, leading or imitating note by note. This last, even with the vina, would be foolish; with a blatant instrument like the harmonium, incapable, moreover, of any gliding from note to note, it becomes repulsive.

Much the same argument applies to the use of a system of notation; for the purposes of exact knowledge—most desirable as a means of escape from the present chaos—it is very important that a suitable method of transcription should be discovered. But the publication of Indian music in staff notation, without warning that the scale is other than that usually implied by that notation, tends to the destruction of the character of that music in the same way as the use of a tempered harmonium. It is for the purposes of science, of

teaching, of the preservation of existing songs, and the making of these accessible to Western students, that a notation is now so necessary—above all, for the preservation of what is so rapidly disappearing, and must soon be lost. But if it be possible to maintain still, amidst the general popularization of music in the modern and democratic sense, a tradition of master-musicians in pupillary succession, as heretofore, then for these it is far better that the method of oral transmission should be maintained. No matter if the masters in different parts of India do not all agree; the very divergences of their râgas may be an expression of local character. But it is not for the sake of variety that I would preserve the system of oral transmission; but rather because this is the true method of learning for an artist, because every singer so taught must be in some degree a composer (he is taught, not merely to repeat a given song, but to sing in a given mode and mood), and because it is so great an advantage for the true musician to need no external aid to memory, such as a printed score. Indeed, I suppose that even if we succeed in recording the greater part of Indian music as it still survives, the music itself cannot persist as a part of everyday life unless it is thus handed on as a sacred tradition.

In any case it is much that the existing music should be recorded and analyzed for the student of whatever time or country. The necessity of such a record in India need not be dwelt upon; but perhaps the most valuable result of the growing interest in Indian music would be realized if the time ever comes when, in the words of Captain Day, "the study of the national music of the country will occupy, as it should, a foremost place in all Indian schools," and certainly, also, in the Universities. But I should also like to emphasize the importance of this study for western musicians; not only as a means of better understanding the heart of India, but also because it must be in the long run disadvantageous to ignore one half of the world's experience in any art. If Indian music is very different from European—and the fundamental difference is less than at first sight appears—then all the more reason for the Western musician to enlarge his outlook. Perhaps even, in the words of M. Bourgault-Ducoudray, Oriental music may "provide Western musicians with fresh

resources of expression, and with colours hitherto unknown to the palate of the musician." At least we may feel certain that both for us, and for the Western student, the exact study of the science of Indian music is a necessary process in the interests of progress and interpretation.

It is then with gratitude that I have accepted Mr. Clements' invitation to write a preface to his learned and stimulating work; in so doing I wish to specially commend both the whole subject of Indian music, and this book, to the notice of all Indians and Englishmen who have any voice in determining modes of education in India.

ANANDA K. COOMARASWAMY.

LONDON,
*September* 12, 1912.

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# INTRODUCTION

THE art of music in India has for centuries been neglected and despised by the general public. That period is now happily over, and an awakening of interest is everywhere manifest; educational institutions of recent birth are in a flourishing condition, and there is a demand on all sides from amateurs for musical tuition, while treatises, and new notations and editions of ancient texts are continually being published. It cannot be denied, however, that all this energy is in urgent need of the guidance which a sound musical theory would afford. Modern text-books may appear learned to the uninitiated; the historian will, however, frankly admit that, since the days of the Sangit Ratnâkar, Indian musical systems have fallen into such confusion that no one has been able to reconcile the teaching of that authoritative treatise with later works on the subject, or with the practice or theory of modern musicians. The art is also in grave danger of being spoiled, as other Indian arts have in the past been spoiled, by cheap imitation. Contact with the West has resulted in a blend of Indian music with European intonation, a combination in the highest degree inartistic and likely to prove more harmful than the neglect of centuries.

Those who invent notations no better than others already in existence, with an elaborate superfluity of new and wonderful signs, in the hope of handing their names down to posterity as inventors are friends of doubtful sincerity. Those who use the staff-notation for the purpose, without attempting to distinguish the special features of Indian intonation, are encouraging the heresy that intonation is of minor importance. Those teachers who promote the sale of tempered harmoniums, and make use of them in the class-room, are proving their own incapacity to guide the musical

renaissance of their country. The head of one institution finds the tempered harmonium an excellent means of teaching beginners "the scale." What scale, one may ask, for it does not give a reasonable approximation to any Indian scale? He admits that the "peti," as it is commonly called, cannot render all the Râgas; has he not, in his publications, drawn attention to this defect? When the beats given by the fifths, fourths, and thirds of his instrument are shown to him, he says that he is aware of them, and considers them somewhat like the Indian embellishment known as "kampit." When asked whether he follows the teaching of Sârangdev, the author of the Sangit Ratnâkar, he replies: "He is not really an old authority; we go back to the Sâma Veda; we are of opinion that Sârangdev is wrong in many respects, and we reckon our srutis downwards instead of upwards."[1] To go back to the Sâma Veda is a happy inspiration, as that work, so far as it touches the question of scales, deals in pure generalities.

Europeans, on their part, are too ready to assume that the Indian scales are artificial and capricious, and too prone to ascribe to "quarter-tones" distinctions between intervals with which they are not familiar, such as the difference between the major-tone and the minor-tone. Intervals less than a semitone are frequently employed in grace or embellishment, but very seldom in scales. When they form part of a scale, it is possible in many cases to regard them as constituents of natural chords of the seventh, the tempered equivalents of which are well known to the Western musician as discords. It is also a prevalent idea that, in the study of Indian music, intonation may be neglected as being of minor importance. This view is, however, demonstrably wrong; the student who masters the subject of intonation will find no difficulty in solving the remaining problems of Indian musical theory.

The following pages deal with the subject of intonation, principally as applied to the school of music known as the Hindustâni School. The author ventures to hope that when once the rationale of the "kaishiki" or hair's-breadth distinctions of the Sangit Ratnâkar is grasped (and may the reader

[1] See p. 48.

beware of following a certain well-known author, and calling them "aggravating") writers and teachers will no longer be found ignoring the difference between the ri of Bhup and the ri of Deshkâr, the ga and ni of Kâfi, and the ga and ni of Bahiravi. As it is impossible to treat the subject of intonation adequately without an appropriate musical notation, part of this volume will be devoted to the presentation of a method by which Indian music may be accurately written. The researches of Mr. Deval of Sangli, which have rendered possible the scientific treatment of the subject in hand, will be described, and an account given of the Indian harmonium by means of which the accuracy of his conclusions has been demonstrated. Passages from the Nâtya Shâstra of Bharata and the Sangit Ratnâkar will be quoted and commented upon in the light of this new science of intonation. It will be found that interesting conclusions suggest themselves as to the early beginnings of the Hindu scales. As a result of the author's conclusions, tentative suggestions will be made as to the scientific classification of the Indian scales. For the sake of those who are interested in European instruments the manner in which they may be adapted to perform Indian airs in correct intonation will be explained.

The author wishes to acknowledge his indebtedness to Mr. V. N. Bhâtkhande of Malabar Hill, Bombay, the publisher of Lakshya Sangit, and author of Hindustâni Sangitâchi Paddhati, and other works, but for whose generous help in the way of translating and collating Hindu texts this volume would never have been written.

E. C.

*September* 9, 1912.

# INTRODUCTION TO THE STUDY OF INDIAN MUSIC

## CHAPTER I

### THE SRUTIS OF MODERN HINDUSTANI MUSIC

MR. A. M. CHINNASWAMI MUDLIAR writes in his "Oriental Music in European Notation:" "Considering the prodigious number of nationalities and the diversity of provincial dialects in existence throughout the length and breadth of the Indian Empire, it should be no matter of astonishment if there be found any number of heterogeneous systems, as well as incongruous classifications in standard works forming the musical literature of the land. The primary distinction is into two classes, Mârga (celestial) and Deshi (terrestrial); the latter is now broadly divided into Hindustani and Karnâta, the former representing the school established by Hanuma, and the latter the much more ancient and authentic system introduced by Nârada, the inventor of all Arts and Sciences. It is clear, however, that local tastes and methods of training have considerably upset the theories originally propounded. . . . Of late the Hindustâni element (which has itself much deteriorated owing to foreign admixture) has been ingrafted on the Dravidian modes to an alarming extent."

**The Hindustâni and Karnatic schools of music.**

Mr. Mudliar's opinions as to the respective merits of "Dravidian" and Hindustâni music, and on the subject of deterioration, are interesting, but in view of the fact that he accepts the tempered scale and the European tempered notation as a medium of instruction, they need not command acceptance. His volume is a praiseworthy effort and most valuable to the student, but, owing to a deficiency in the

critical faculty as regards musical intonation, Mr. Mudliar unfortunately encourages the worst kind of deterioration which has ever affected Indian music. The present work deals with Hindustâni music only; the author hopes to be able to show that a great part of it is directly traceable to the systems set forth in Bharata's Nâtya-Shâstra of about the fifth century A.D., and the Sangit Ratnâkar of the thirteenth century. These are the most closely reasoned and critically worded of the early text-books. It is reputed that Sârangdev, the author of the Sangit Ratnâkar, was an inhabitant of Kashmir. From internal evidence one would conclude that the music he describes is that of Hindustân. However, the pandits of Southern India endeavour to appropriate him to themselves. The present writer hopes to show that it is only by doing violence to his theory that it can be applied to Karnatic music. Roughly speaking, Hindustâni music may be said to prevail in the north and west of India and the Deccan, while Karnatic music is confined to the south and east. Many scales are common to both, but the general spirit of the two systems is apparent from the scales which are first taught to beginners; in the west, the scale is the same as the just major scale of Europe,[1] in the south it is a chromatic scale (known in Hindustâni music as the scale of the Râga Bhairava) with semitones between the first and second, third and fourth, fifth and sixth, seventh and eighth degrees.

**Indian music—the Grâmas, Jâtis, and Râgas.**

There are grounds for believing that the remote precursors of these two scales were pentatonic, one the scale which has been found amongst almost all nations and which may be roughly indicated thus—C, D, E, G, A, C, and the other the old Greek scale of Olympus. Complete scales of seven notes were in existence many centuries before Christ, and the notes bore the "tonic-solfa" names **sâ ri, ga, ma, pa, dha, ni, abbreviations of shadj, rishabh, gândhâra, madhyam, pancham, dhaivat, nishâd.** Ancient theory puts the development of scales and melodic forms in the following order: first came the *Grâmas*, which may be regarded as collections of notes definitely related to one another by musical intervals. Writers on the subject persist

[1] Sometimes the scale with the high sixth is used; the practice in this respect does not appear to be uniform.

in thinking of the Grâmas as scales because each was named after a particular note. This was not the mode of thought followed by Bharata and Sârangdev. A grâma might be regarded as a string of notes ranging through three or four octaves. To sing a scale out of the string, a starting-point must be chosen. A scale of seven notes from the string was called a *Murchhana* of the note so chosen. This was the second step. A scale which was to form the basis of a melody required something beyond a "lowest note," something to establish its harmonic individuality. The *Jâtis* were elaborated as the third step; their character was largely determined by the note chosen as the drone or pedal accompaniment; they also had a fixed final note, and Vâdis and Samvâdis; the latter being pairs of notes a fourth or a fifth apart which determined the tonality or harmonic structure of the scale. After the Jâtis came the Grâma-Râgas, which may be regarded as generic melody-types, and their descendants the *Râgas* of modern India. The best singers in India, those whose art has not been contaminated by the tempered harmonium, prefer to sing to an accompaniment of the tambura alone, or the tambura with drums. The *tambura* is a stringed instrument of rich tone upon which a powerful drone is produced consisting in almost all cases of the fundamental note, which Europeans would be inclined at first to call the "tonic," and its fifth. With such an accompaniment it would be next to impossible for any singer with a sensitive ear to sing the first five notes of the ordinary major-scale in anything but just tuning, unless he departed therefrom of set purpose, for the fifth upper partial tone of the bass is to be heard distinctly, and the third upper partial of the fifth above. Wherefore the use of the tambura is to be recommended for the singer of Folk-songs also, unless a harmonized accompaniment in natural tones is to be obtained. To proceed, the Indian singer will always be able to state in what Râga or Râgas his song is composed. The name of the *Râga* connotes a scale bearing a fixed relationship to the drone, with its harmonic structure determined by a Vâdi and Samvâdi, a chief note ("ansha svara") occurring more frequently than others, a lower limit described in terms of the Murchhana, occasionally an upper limit also, certain characteristic turns of melody,

recurring with frequency, certain rules regarding the employment of embellishments, and a stated time of the day for its performance. It is a common practice, after singing an air in a Râga, to improvise a series of free fantasia passages, each returning in due course to a characteristic snatch of the melody, only to wander off again in still more elaborate variations. The whole performance must be "within the Râga," that is, without transgression of the elaborate rules governing its structure.

**Scope of the present work.**

Until recently, with trifling exceptions, Râgas, with their rules and scales and compositions, were handed down from teacher to pupil without the aid of any written record. It is not surprising, therefore, that a good deal should have been lost, and that different singers should be at sixes and sevens regarding the names and distinguishing features of the Râgas. Various investigators have made compilations with the intention of making known the scales used in various Râgas. These compilations are useless to the present writer, because they one and all ignore the "hair's breadth" distinctions upon which correct intonation depends. The present work does not essay to give a list of Râgas or scales, but merely to point out a method by which they may be classified. Where the reader may have any criticism to offer regarding the scales given as examples, and the names attached to them, he should remember that they are taken, with one or two exceptions, from the répertoire of one artist, Abdul Karim. The author is aware that in some cases other singers employ other scales or sing the same scales under other names. The reader should also understand that, as an introduction to the study of Indian music, this book does not go beyond the province of intonation. Once a census of Indian Râgas is made, and once their scales are classified into groups according to the principles of correct intonation, their further subdivision according to harmonic structure, as determined by the "Nyâs Svara" (final note), and Vâdi and Samvâdi, may be undertaken. With the material at present available it is impossible to make any suggestions as to the manner of proceeding with such further subdivision.

From ancient times up to a comparatively modern date,

the notes or "svaras" which, strung together, constituted the Grâmas were called "*shuddh*," which means "pure." In the modes or Jâtis of each Grâma certain chromatic variations in the notes were used for the sake of melodic effect. The notes so altered were called "*vikrit*." The name "vikrit" was extended to any new note obtained by shifting the frets of the solo instruments in use, such as the viṇa and sitâr. Various tuning devices for a change of mode involving a shifting of the frets without retuning the chanterelle or drone strings came to be employed. A great deal of discussion has centred round these "shuddh" and "vikrit" notes, but for the most part it has been infructuous because the looseness and inaccuracy of the term "vikrit" has not been sufficiently grasped.

**The shuddh and vikrit notes.**

The ancients believed that if the octave were divided into twenty-two roughly equal parts all the notes in use could be obtained. They called these small intervals "*srutis*," and spoke of intervals of two srutis, three srutis, and four srutis, and of raising or lowering a note by one sruti or more. They believed that all the "shuddh" and "vikrit" notes had srutis to themselves. The author concludes, from a study of Bharata's Nâtya Shâstra and the Sangit Ratnâkar of Sârangdev, that their system in reality involved the use of 25 notes to the octave, and not 22 as they imagined (see Appendix E).

**The srutis.**

Their theories were founded upon the system of tuning described as confined to Hindustân in Captain Day's "Music of Southern India" (p. 109). In that system the chanterelle strings were dhaivat, rishabh, and gândhâra. This is a conclusion which one cannot fail to draw from a careful study of their text-books. Now, the modern system of tuning throughout India has shadj as the principal drone, accompanied by pancham or madhyam. Not only this, but shadj and pancham are regarded as fixed notes which may never become "vikrit," or, in other words, sharpened or flattened, and shadj has acquired the privilege of being regarded as the basis of all scales. All Jâtis, therefore, start from Shadj, and all the scales of all the Râgas.

**The old tuning method now obsolete.**

It is clear, therefore, first that the modern srutis and the

ancient srutis must differ in many cases, and, secondly, that there are no longer strings of shuddh notes from which to construct Jâtis and scales of Râgas. This latter conclusion, which there is no gainsaying, has escaped the notice of all writers on the subject. In practice it has been recognized by some of the Hindustani musicians, who accordingly discard the word "shuddh" except in the case of sâ and pa, and call the other notes atikomal, komal, madhya, or madhya-tivra, tivra, tartivra, according to their position in the scale. The author follows their practice in this respect.

**Ancient terminology no longer appropriate.**

Until Mr. K. B. Deval, a retired deputy collector, residing at Sangli in the Southern Maratha Country, commenced his researches, the subject of Indian intonation had baffled all inquirers. Many books had been written by Indian gentlemen and others with the laudable object of explaining what Indian music was, but the European in India, who was interested in the subject, found that there was a point beyond which he could not go. Mr. Deval constructed a diachord consisting of two wires of equal length stretched over a sounding board, one wire being provided with a graduated scale and a movable fret of the same height as itself. His method was to tune both wires to the same pitch, that of the shadj of the singer assisting him. He moved the fret of the wire which had the graduated scale into the position which gave the note which the singer had been asked to sing. A simple calculation from the reading of the scale gave him the comparative vibration-number of the given note in relation to shadj. He persevered for years at this investigation, deriving assistance from many of the best singers that India could produce. As regards most of the notes in use, his conclusions, when referred back to ancient theory, may be summed up in the statement that two srutis make a just semitone, three srutis a minor-tone, and four srutis a major-tone. In respect of these notes the accuracy of his conclusions can fairly be said to be beyond controversy. The remaining notes belong to certain irregular scales ; a knowledge of the melodic structure of the Râgas in which they are employed was called in

**Mr. Deval's researches and the Indian harmonium.**

to assist the verification upon the diachord. Mr. Deval published his conclusions in "The Hindu Musical Scale and the Twenty-two Srutees," printed at the Arya Bhushan Press, Poona. The next step was to order a harmonium tuned in the twenty-two intervals which he termed the "twenty-two srutees" of the "Hindu Musical Scale." This instrument was designed by Mr. H. Keatley Moore, B.A., Mus. Bac., who assisted the late Mr. A. J. Ellis in the latter's translation of Hemholtz' "Sensations of Tone." After some slight modification in tuning and the arrangement of the keys, the result of verification and experience, the instrument has been patented (15548/11); the manufacturers are Messrs. Moore & Moore of New Oxford St., London (the makers of Ellis' Harmonical), and the agents in India are Messrs. S. Rose & Co., Bombay. The author has, through Mr. Deval's courtesy, and with the help of Abdul Karim and other singers, been able to verify all the various scales mentioned in the following pages upon this instrument.

The following table describes the twenty-four notes in most frequent use, showing which of them are adopted in the Indian harmonium, and their relationship with the ancient srutis.

**Description of terminology here adopted.**

| Numbers and names of the Ancient Srutis. | The more common of the Modern Srutis: in what Rágas used. Moore's harmonium notes numbered in brackets. | European equivalents, Shadj being F. | Sign. | Comparative vibration number, sâ being taken for convenience of calculation to be 240. |
|---|---|---|---|---|
| 0. Kshobhini | (0) Nishâd komal[1] (Kâfi, Khamâj) | Low E♭ | ni 𝄫 | 213⅓ |
| 1. Tivra | (1) Nishâd kaishik[1] (Bahiravi) | E♭ | ni ♭ | 216 |
| 2. Kumudvati | (2) Nishâd tivra[1] (Kalyân) | E | ni ♮ | 225 |
| 3. Manda | (3) Nishâd tartivra (Mârvâ) | F♭ | ni 𝄪 | 227⅓ |
| 4. Chhandovati | (4) Shadj[1] | F | sâ | 240 |
| 5. Dayâvati | (5) Rishabh atikomal ("Septimal" Asâvari) | Septimal G♭ | ri 𝄬 | 252 |

NOTE.—The names of Ragâs are merely given as a help towards identification.

[1] The modern Srutis, marked with a figure [1], are identical with the ancient Srutis of the same serial number. This will be seen in a later chapter.

| Numbers and names of the Ancient Srutis. | The more common of the Modern Srutis: in what Râgas used. Moore's harmonium notes numbered in brackets. | European equivalents, Shadj being F. | Sign. | Comparative vibration number, sâ being taken for convenience of calculation to be 240. |
|---|---|---|---|---|
| 6. Ranjani | (6) Rishabh komal[1] (Bahiravi) | G♭ | ri♭ | 256 |
| 7. Raktikâ | (7) Rishabh madhya[1] (Kâfi, Deshkâr) | Low G | ri ♮ | 266⅔ |
| 8. Raudri | (8) Rishabh tivra[1] (Kalyân, Asâvari) | G | ri ♯ | 270 |
| 9. Krodhâ | (9) Gândhâra komal[1] (Kâfi, Todi) | Low A♭ | ga 𝄫 | 284⅘ |
| 10. Vajrikâ | (10) Gândhâra sâdhâran[1] (Bahiravi) | A♭ | ga♭ | 288 |
| 11. Prasârini | (11) Gândhâra tivra[1] (Kalyân) | A | ga ♯ | 300 |
| 12. Priti | (12) Gândhâra tartivra (Jayjayvanti) | High A | ga ♮ | 303¾ |
| | Madhyam atikomal[2] (Yaman-Kalyân) | B♭ Septimal | ma 𝄬 | 315 |
| 13. Mârjani | (13) Madhyam komal[1] (Kâfi, Bahiravi, Bihâg) | Low B♭ | ma 𝄫 | 320 |
| 14. Kshiti | (14) Madhyam kaishik (Dhâni) | B♭ | ma♭ | 324 |
| 15. Raktâ | (15) Madhyam tivra (Kalyân) | B | ma ♯ | 337½ |
| 16. Sandipani | (16) Madhyam tartivra (Mârvâ) | C♭ | ma ♮ | 341⅓ |
| 17. Alâpini | (17) Pancham[1] (Kalyân, Bahiravi) | C | pa | 360 |
| 18. Madanti | (18) Dhaivat atikomal ("septimal" Asâvari, Todi) | Septimal D♭ | dha 𝄬 | 378 |
| 19. Rohini | (19) Dhaivat komal[1] (Bahiravi) | D♭ | dha♭ | 384 |
| 20. Ramyâ | (20) Dhaivat madhya[1] (Kâfi, Bilâval, Mârvâ) | Low D | dha ♮ | 400 |
| 21. Ugrâ | (21) Dhaivat tivra[1] (Kalyân, Bihâg) | D | dha ♯ | 405 |
| | Nishâd atikomal | Septimal E♭ | ni 𝄬 | 420 |
| 22. Kshobhini | (22) Nishâd komal[1] (Kâfi, Khamâj) | Low E♭ | ni 𝄫 | 426⅔ |

It is a lamentable fact that there is no uniform system of naming the Indian notes. The difficulty which confronted the author was to put distinctive names to srutis, which although

[1] See note 1, previous page.

[2] If C on Moore's harmonium is taken as sâ, the stud marked 𝅘𝅥 (*i.e.* in key pancham) gives atikomal ma. It was found impossible to include this note in key F.

invariably distinguished in practice, are generally confounded under the same name. Such is the case with numbers 7, 8, and 20, 21 of the above. The name madhya or madhya-tivra is used by Abdul Karim to distinguish the lower of the two notes, and the practice being generally acceptable is here adopted. With regard to the groups 0, 1 and 9, 10 and 13, 14 more difficulty was experienced. The last (No. 14) has never hitherto been differentiated in name from the note below. The following table will show at a glance what justification the author has for adopting the names above given.

| Srutis. | | Ancient names. | Names obtaining in Madras. | Names obtaining in Hindustan. | | Names here adopted. |
|---|---|---|---|---|---|---|
| | | | | First Method. | Second Method. | |
| 0 | ni ♮ | Shuddh | Kaishik | Komal | Atikomal | Komal |
| 1 | ni ♭ | Kaishik | | | Komal | Kaishik |
| 9 | ga ♮ | Shuddh | Sâdhâran | Komal | Atikomal | Komal |
| 10 | ga ♭ | Sâdhâran | | | Komal | Sâdhâran |

The confusion of nomenclature displayed in Southern India and for the most part in Hindustan is a heritage from the change of tuning discussed in later chapters. Atikomal for ni ♮ and ga ♮ will be felt to be a misnomer by any one acquainted with the other atikomal notes. It is an absurdity to call the principal notes of Râga Kâfi or Sri-Râga by such a name, notes which originally formed the basis of the Shuddh Jâtis. They are no more atikomal than ma ♮ which is universally called either komal or shuddh. The author distinguishes ma ♮ and ma ♭ on the analogy of the corresponding srutis of nishâd. The distinction between ga ♮ and ga ♭ is of precisely the same nature, and the name kaishik for ga ♭ would be appropriate, were it not for the fact that the note has for centuries been called sâdhâran ga.

It can hardly be disputed that the twenty-two notes chosen as the basis of tuning of the Indian harmonium are the commonest of the Indian notes. It must be remembered that in calling them the twenty-two srutis of modern Indian music, one is using the word sruti in a transferred sense, for strictly speaking a sruti is an interval and not a note.

Secondly, the orthodox ancient system regarded shadj (and other notes also) as of fixed absolute pitch, the pitch of each shuddh note being referable to the cry of some animal or the note of a certain bird. Although some singers of the present day follow the ancient theory in this respect and have their own inflexible notion as to the proper pitch of shadj, the usual custom is to take any pitch that is convenient to the singer or performer. Thus the term sruti has been made to depart from its original meaning in two directions.

It will be useful to tabulate the notes employed in the Indian harmonium thus—

| Name of note as abbreviated in singing. | Middle row of studs, marked "ak" and "k." | Black keys. | Front row of studs marked "m." | White keys. | Back row of studs marked "tt." |
|---|---|---|---|---|---|
| Sâ | — | — | — | Shuddh | — |
| Ri | Atikomal ♭ | Komal ♭ | Madhya ♮ | Tivra ♯ | — |
| Ga | Komal ♭ | Sâdhâran ♭ | — | Tivra ♯ | Tartivra ♮ |
| Ma | Komal ♭ | Kaishik ♭ | — | Tivra ♯ | Tartivra ♮ |
| Pa | — | — | — | Shuddh | — |
| Dha | Atikomal ♭ | Komal ♭ | Madhya ♮ | Tivra ♯ | — |
| Ni | Komal ♭ | Kaishik ♭ | — | Tivra ♯ | Tartivra ♮ |

**Brief explanation of the notation employed.**

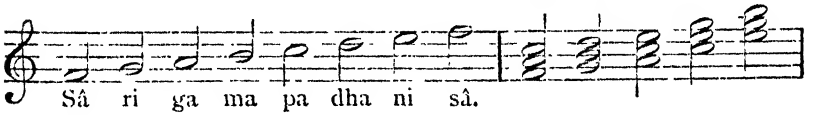
The rest of this chapter will be taken up with a brief account of these twenty-two notes and their distribution among the commoner Indian scales. This account is intended for the European reader who presumably has some acquaintance with the theory and notation of Western music; others are referred to the more detailed explanation to be found in the next chapter.

In the Indian harmonium, shadj has been given the pitch of F (Philharmonic, 1896); apart from that circumstance, the notation to be employed has absolutely no connection with any key or pitch. Shadj, which may be defined as the bass note of the drone in modern music, is represented as F for convenience, and the two F's of the treble clef encompass

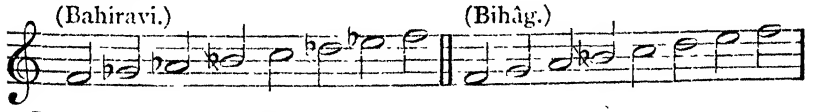
the middle register of all voices from soprano to bass. The word "register" is here used in place of the Indian "saptak"; the Indian musician divides the compass of all human voices into three "saptaks," or octaves, the middle one naturally being the one most frequently in evidence. The signs used above represent respectively—(1) ♭ a septimal flat, the true harmonic seventh of the note on the black key next above; (2) 𝄫 a low flat, derived in a descending series of perfect fifths from sâ; thus ma 𝄫 is a fifth below sâ, ni 𝄫 a fifth below ma 𝄫, and ga 𝄫 a fifth below ni 𝄫; (3) ♭ a flat, ri ♭ being a major-third below ma 𝄫, and the rest related to ri ♭ by an ascending series of perfect fifths; (4) ♮ a low natural, ri ♮ and dha ♮ being in tune with ma 𝄫; (5) ♮ a natural in just tuning, the intervals being referred to the scale of pa (or C) major; (6) ♮ a high natural in the case of ga ♮, which is a fifth above dha ♮, and respectively pa ♭ and sâ ♭ in the other two cases.

The first scale to consider is that of Râga Yaman—

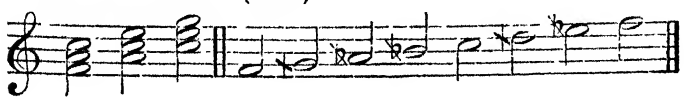
Common Chords.




Here, sâ and pa are shuddh, and the rest tivra. As usual, the sign ♮ is omitted. In order to facilitate explanation, the position on the Indian harmonium keyboard will be considered; that is to say, the above scale will be taken to be actually from F to F. It will be noticed that the tuning is just tuning in the key of C major. D, F and D, A are not in tune; C to D, F to G, A to B are major-tones; D to E and G to A minor-tones; and E to F and B to C just semi-tones. In the following scales (in all Indian scales, in fact) the positions of sâ, ri, ga, etc., on the lines and spaces are exactly the same as above.



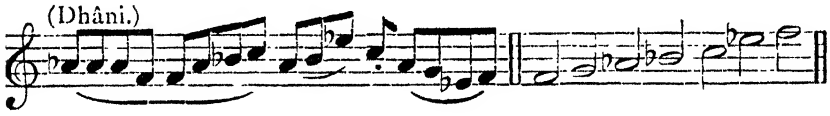

Common Chords. (Kâfi.)



The first (Bahiravi) is a mode of the scale just described. E to E in the Yaman scale has the same intervals in the same order. Here ri and dha and ma are komal, ga sâdhâran, ni kaishik. The Bihâg scale is that of Yaman with the flat fourth. It differs from F major in just tuning in this respect, that the sixth being high (or Pythagorean) the number of common chords available is reduced to three. The Kâfi scale is the mode of its second; in other words, corresponds to the scale G to G in Bihâg. The Kâfi scale, therefore, has only three common chords. The notes used in Kâfi are ri and dha madhya, ga, ma, ni komal.

The above are what might be termed "diatonic" scales; the first two belong to the Madhyam Grâma, like the European major-scale in just tuning, while the last two belong to the Shadj Grâma.[1] It will be noticed that as many as sixteen different srutis are comprised in them.

The following passage is also of a "diatonic" nature; it introduces the high flat fourth (ma kaishik):—

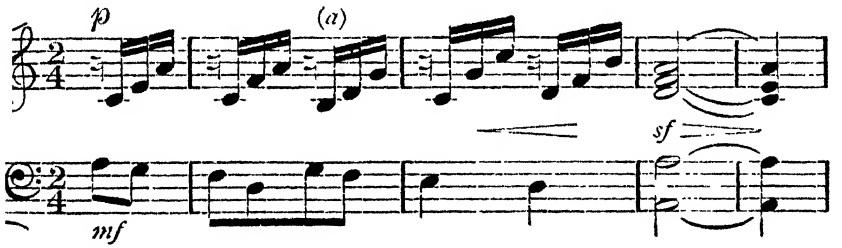



The scale which is given on the right is hexatonic. Adding dha ♭ (D ♭) makes it a mode of the Yaman scale, corresponding to the mode of the sixth of A ♭ major in just tuning. This scale will have five common chords.

This finishes the notes comprised in the "diatonic" or Grâma-scales. The reader who is only acquainted with equal temperament may find it hard to realize that the D in tune with F, and the D in tune with G, to take an example, are notes separated by an interval ($\frac{81}{80}$), which any untrained ear can appreciate and which can even be committed to memory and reproduced vocally. The accidentals above, which include a downward stroke (♮, 𝄫), in all cases mean a flattening by this interval, the interval which separates the minor-tone from the major-tone.

[1] The use of the high sixth instead of the harmonic sixth in what may be loosely termed the parent scale makes the difference between the two grâmas. The grâmas are fully explained in the next chapter.
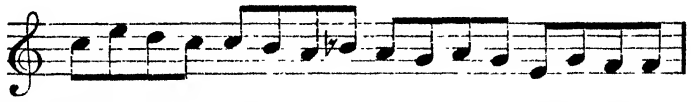
The difference between just tuning and temperament is well illustrated, not only in the Indian Râgas, but in the treatment accorded to Folk-songs by modern musicians. If it is not practicable to accompany Folk-songs with just harmonies, one would think that it might at least be advisable to write an accompaniment which could be played upon an instrument in just tuning if such were to be had. This, however, is not the course usually adopted. The compiler of collections of Folk-songs, instead of ascertaining the chords in just tuning which are available to him, trusts to a vague musical instinct, with results of which the following is an example— **European Folk-song music.**



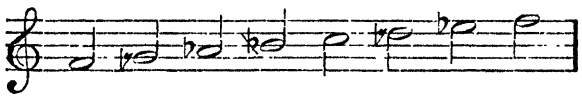

In the Folk-song to which this is an introduction (No. 5 at p. 13, of "Trente Mélodies Populaires de Grèce et d'Orient," by M. Bourgault Ducoudray), the "final" is A and the "dominant" D, that is to say, low D (D ♮), the note a fourth above A. It is an error, in the chord marked (*a*), to make D harmonize with G, unless just tuning is entirely disregarded. To put the matter in another way, the D used in the G chord is not in the mode. In the same way, in the next number, at the thirty-fifth bar, a foreign chord is introduced. Similar examples might be multiplied; they are to be found in many such collections.

The reader is referred to the next chapter for a full explanation of the tartivra notes in connection with the scales of Râgas Mârvâ, and Jayjayvanti. Whether the view there suggested regarding the development of septimal harmonies from the chromatic scales is correct, admits of considerable discussion. Septimal intervals may be an addition for which the Hindu people should be thankful to the Mahommedans. Harmonically they add considerable charm to the Indian Râgas, and **Explanation of notation continued.**

this short sketch of the modern Indian srutis would be incomplete without some account of them. The following passage from the Râga Yaman-Kalyân introduces an atikomal note which it was found impossible to incorporate in the Indian harmonium—



The eighth note is the harmonic seventh of C, forming the interval $\frac{7}{4}$ with the middle C, and $\frac{21}{20}$ with A. Those unacquainted with the natural intervals would be surprised at the large interval separating this note from the ordinary B flat (B ♭). As the Indian name atikomal implies, the note is very flat indeed. The atikomal ri and dha of the following scale, taken from a Râga which Abdul Karim call Asâvari, belong to the same class—



An atikomal ga and an atikomal ni of similar description are employed in some rare Râgas. A low ga, the very slightest degree lower than ga tivra, making the interval $\frac{7}{6}$ with ri ♭ is also occasionally employed. The well-trained Indian singer is thoroughly conversant with septimal intervals and intones them with accuracy and without hesitation.

The number of irregular scales employed by different singers is considerable, and modern Indian musicians, with pardonable exaggeration, describe the srutis they sing as "anant" or endless. In the following chapter will be found a note regarding the extent to which it is possible to discuss these rare scales and intervals in the present work.

## CHAPTER II

### THE STAFF NOTATION AND THE SRUTIS

THE purpose of this chapter is to give an account, fuller than the sketch given above, of the manner in which the various notes or srutis in use in Indian Râgas may be represented in an adaptation of the staff notation of Europe.

For the sake of those who are not thoroughly conversant with the scientific side of the subject, it will be advisable to explain as briefly as possible what is meant by the harmonic series and by natural and tempered intervals.

**The measurement of Musical intervals by ratios.**

The sensation of sound is due to vibrations of the air. A musical note is distinguished by the regularity of the vibrations of which it is composed. Strictly speaking, a musical sound defined by a certain number of vibrations per second should be denominated a "tone." In order to avoid ambiguity, however, the author uses the word "note" for the purpose. The original meaning of "note" was the sign in notation by which a tone was expressed; in common parlance it has also the meaning which is here assigned to it. The interval, or "distance" as Bharata has it, between two notes is completely defined by the ratio which their vibration-numbers bear to each other. It follows that in order to obtain the sum of two intervals, one must multiply their ratios; and to obtain the interval which constitutes the difference between them, one must divide the bigger ratio by the less.

**The Harmonic Series.**

The notes of stretched strings and of many other musical instruments are clothed in upper partial tones or harmonics; it is this circumstance which gives them their "timbre" or quality. It is a general law that if the tension of a stretched string is constant, and notes are sounded upon different lengths of it (this may be

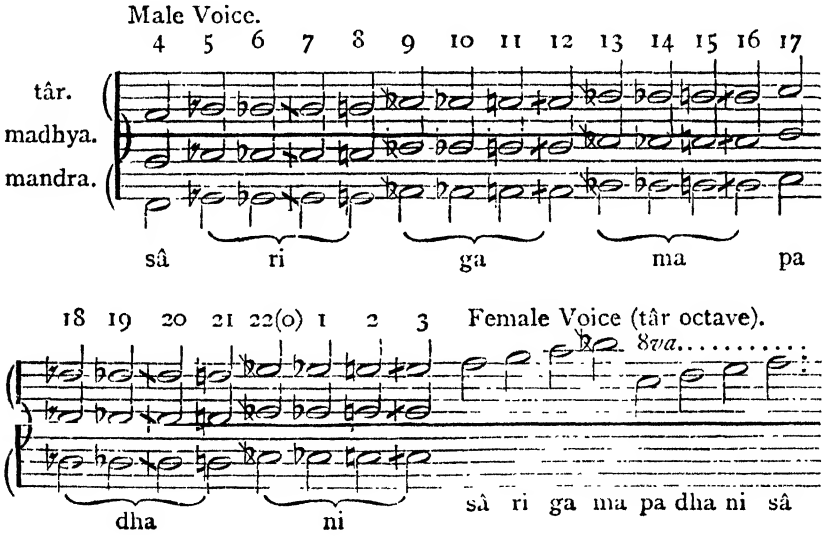
done by means of the device adopted by Mr. Deval in his diachord, namely, adjusting a movable fret of the same height as the string at the required distance, pressing the string lightly upon the fret, and plucking the string upon the side adjusted to the given length), the vibration-numbers of those notes will be inversely proportional to the length of string required to produce them. Thus, if the whole string gave a note of 100 vibrations a second, $\frac{2}{3}$ of the string would give a note of 150 vibrations a second. The upper partial tones which enrich a note are thus explained:—The primary note which the ear recognizes is that given by the vibrating length of string as a whole. A plucked string, however, vibrates not only in its whole length, but in nodal segments corresponding to the fractions of the harmonic series, $\frac{1}{2}$, $\frac{1}{3}$, $\frac{1}{4}$, $\frac{1}{5}$, $\frac{1}{6}$, etc. Hence, together with the primary note of, say, $n$ vibrations a second, are faintly sounded a long series of notes of vibration-numbers represented by $2n$, $3n$, $4n$, $5n$, $6n$, etc. In the notes of the tambura, these upper partial tones are so strong that the untrained ear may easily recognize them as far as the fifth member of the series. The series of notes formed by the generator and its upper partial tones is commonly called the harmonic series. To the student of the Indian scales a knowledge of it is essential, as all the melodic intervals which the musicians of ancient Hindustan thought beautiful and worth preserving are traceable ultimately to its influence.

**The Great Staff and the three Saptaks of Indian vocal music.**

The staff-notation is a graphic method of writing music. It possesses a distinct advantage over any method which requires the eye to follow one set of signs for melody (svara), and an entirely distinct set for time (laya). The pitch of a note in staff-notation is shown by its position (*vertically*) on the staff, and the character of its accidental if any, its time value by the sign used, and its place in the measure (âvarta) by its position (*horizontally*) in the bar. This chapter deals only with the pitch of notes as shown by their vertical position; an uniform sign known as the minim (𝅗𝅥) will be used in every case.

The Indian system of vocal music allots three "Saptaks" or octaves to the voice, each Saptak ranging from sâ up to ni.

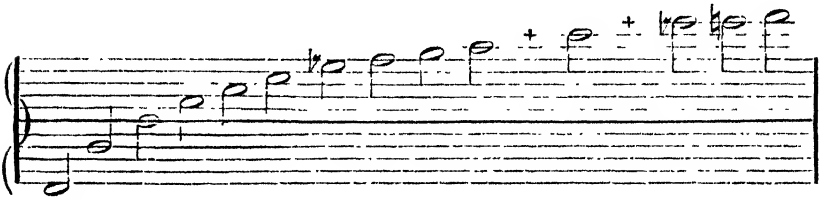
The lowest octave is called "mandra," the middle octave "madhya," and the highest "târ." The Great Staff consists of eleven lines, the middle one of which is thicker than the others. This middle line represents the middle C of the European keyboard. Other notes, above and below the middle C, are represented by spaces and lines alternately. Turning for a moment to the Indian harmonium, the shadj of which is primarily intended to be the F of European music (at the philharmonic pitch of 1896), the 22 srutis in the three octaves may be thus represented on the Great Staff:—




These are the twenty-two more common srutis of modern music, numbered according to the ancient system, in the three "saptaks" of the male voice. Played on the Indian harmonium at the pitch indicated by the Staff, they are correct in point of pitch according to the notions of the singer Abdul Karim. The soprano voice would be an octave higher according to Indian ideas. The madhya and târ saptaks would be the mandra and madhya saptaks respectively of the soprano. The soprano târ octave would be written as indicated, either using short or "leger" lines above the Staff, or using the dotted lines and sign 8va, which mean "to be sung or performed an octave higher."

**The Harmonic Series in Notation.**

The next example shows the relative pitch of the first sixteen of the harmonic series of the lowest sâ on the Great Staff. (As before brackets are used to show the three "saptaks.")



1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16

The 7th, 11th, 13th and 14th members of the series are not to be found among the keys of the Indian harmonium, the 13th is quite unknown to Indian music, so also is the 11th, unless, as stated in a later chapter, it formed part of the Gândhâra Grâma, while the 7th and its octave the 14th are the atikomal nishâd mentioned above (p. 8).

**The use of the sign ♮.**

It will be convenient to state at this point that it is proposed to borrow from European music the practice of using the sign ♮ only in cases where the note of the denomination in question has, when last used, borne a different accidental. For instance, the fifth, ninth, tenth of the series are tivra, but the accidental is dispensed with; the fifteenth bears an accidental, as the note immediately preceding it is also Nishâd and bears the accidental ♭. Thus, sâ and pa, being unchangeable, according to the modern view, will never require an accidental, while the tivra notes will only use their accidental ♮ in the circumstances explained.[1] In European music, the notes which require no accidental ordinarily and make use of the sign ♮ when necessary to distinguish them from preceding notes, are the notes of the scale of C major. The scale of C major in just tuning when played from F to F is identical with the scale of the Râga Yaman, which consists of sâ and pa shuddh, ri, ga, ma, dha and ni tivra.

**Intervals given by the Harmonic Series.**

As the vibration-numbers of the notes of the harmonic series are proportionate to their serial numbers, the series gives at once the ratios of the intervals employed in music. The intervals given by the first ten numbers of the series are in order, the

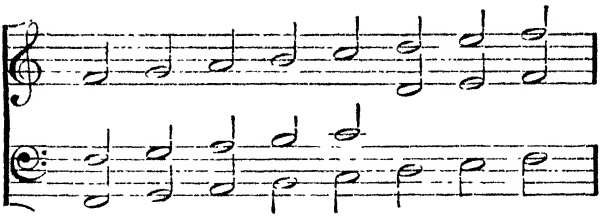
[1] See p. 43.

octave $\frac{2}{1}$, the fifth $\frac{3}{2}$, the fourth $\frac{4}{3}$, the major third $\frac{5}{4}$, the minor third $\frac{6}{5}$, the septimal third $\frac{7}{6}$,[1] the septimal tone $\frac{8}{7}$, the major tone $\frac{9}{8}$, the minor tone $\frac{10}{9}$. The 16th and 15th members give the semitone $\frac{16}{15}$. All Indian scales may be referred to some or other of these intervals. It is not suggested that scales were consciously built up upon such an elaborate foundation as the first sixteen terms of the harmonic series. The intervals given by the first five terms were sufficient for the construction of the early Hindu scales. If the two fifths, sâ to pa, pa to ri, be added together and the interval sâ to sâ or an octave be subtracted, the major tone sâ to ri results. Thus $\frac{3}{2} \times \frac{3}{2} \div \frac{2}{1} = \frac{9}{8}$. Subtracting the major tone sâ to ri from the major third sâ to ga gives the minor tone ri to ga, $\frac{10}{9}$. The semitone $\frac{16}{15}$ is the difference between the fourth $\frac{4}{3}$ and the major third $\frac{5}{4}$. Another semitone, $\frac{21}{20}$, which may be termed the Septimal semitone, is obtained by subtracting the septimal tone $\frac{8}{7}$ from the minor third $\frac{6}{5}$. Septimal intervals appear to have been introduced at a comparatively modern period; they presuppose some kind of acquaintance with the seventh term of the harmonic series.

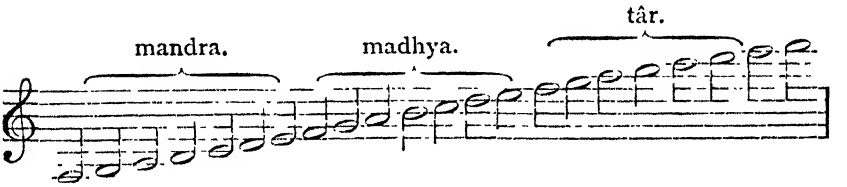
In Appendix B will be found examples showing to what extent the notes of the harmonic series may be obtained from the Indian harmonium. The reader who has access to such an instrument will be interested to discover how harmoniously these notes blend together. The examples are written in Pianoforte Score, which consists of the Great Staff with the middle line omitted. This method will be found to give more facility for reading than the Great Staff; the omission of the central line gives greater prominence to the position of the notes. The Yaman Scale is here shown in the three octaves in Pianoforte Score. The upper staff is known as the Treble and the lower as the Bass; the signs used to distinguish them are called clefs.

**The Notation simplified.**

[1] The author adopts these names as they are simple and appropriate, in preference to the cumbrous names at present used by European scientists.



For writing single melodies without accompaniment it will be unnecessary to use both the treble and bass clefs as here shown. The treble clef will be sufficient for the purpose, with the aid of the following simple convention, which is ordinarily followed in European vocal music. The melody will be written for the female voice; the male singer will sing an octave lower. The following will represent the mandra, madhya and târ octaves in the Yaman-scale for all voices.




If found more convenient, the lower and upper notes, instead of being written upon leger lines, may be written in the madhya octave, with the sign 8va... below or above respectively.

**The Notation in reference to absolute pitch.**

So far, this discussion has reference to Indian music written for the Indian harmonium in the principal key of that instrument. That key (F Philharmonic 1896 = Shadj) was chosen for two reasons—first, because one of the most proficient of Indian singers regards that as the correct absolute pitch of shadj; and secondly, because the key is the very one which anyone in search of the simplest possible notation for Indian music would unhesitatingly fix upon. For purely instrumental music, F will do as well as any other pitch; it will also suit a large number of voices. Difficulty arises only when a singer who finds F an inconvenient pitch wishes to accompany his voice in unison on the Indian harmonium or to learn from that instrument the correct intervals of any particular Râga. To meet these cases, Appendix C has been compiled. From the

typical scales there given it will be easy to pick out the correct notes of any Râga at approximately the pitch desired. The question of notation with regard to keyed instruments may be now put on one side, as, excepting the Indian harmonium, no keyed instrument capable of playing Indian music has yet been constructed.

For the vina, sitâr and other Indian instruments, and for the voice, it is not necessary that the notation shadj should be of any specific pitch. The notation last described is by far the best for two reasons. First, the Staff includes the madhya saptak completely and conveniently. Secondly, as modern Indian music allows no change in sâ or pa, F sharp or C sharp will never be employed; a slight acquaintance with the Indian system teaches one also that no other sharps are in use; consequently, the notation will dispense with the sign ♯, which is used for a sharp note.[1]

**The Notation finally chosen.**

In the notation followed throughout this book the treble clef will be used, the lowest space being appropriated to sâ of the madhya saptak, and the top line to the sâ of the târ saptak. Except in connection with the Indian harmonium, no element of absolute pitch is to be associated with it.

**Scales and Srutis defined.**

A suitable notation having been found, the next step will be to examine certain typical Indian scales which between them furnish all the 22 notes set out above on the Great Staff. To avoid misapprehension, it will be advisable to premiss that a scale is a collection of notes ranging from a given note to the note an octave above and resembling a ladder in this respect, that the array ("thât") of notes must afford a practical means of accent and descent. To describe the 22 srutis above given, or the collection of Shuddh and Vikrit notes given in the Sangit Ratnâkar, as a "chromatic scale" is a misnomer. The European chromatic scale of twelve semitones stands upon a different footing, as chromatic passages taken from it are employed in music. Then, again, it is an error to suppose that the 12 srutis were ever pieced together by fitting small

[1] It is a common practice to put sâ on the line appropriated to C. This renders the use of the accidental ♯ necessary for ma tivra. The scale of C is also an awkward one for passages in the mandra octave.

harmonic intervals between the fundamental note and its octave. The ancient theorists of India had no knowledge of harmonic ratios; to them the interval termed a sruti appeared to be the smallest interval which the human voice was capable of singing; consequently, they assumed roughly that their 22 srutis divided the octave into equal parts. Recent research has, however, made it abundantly clear that the direct descendants of the ancient intervals of four srutis, three srutis and two srutis, are respectively, the major-tone ($\frac{9}{8}$), the minor-tone ($\frac{10}{9}$) and the semitone ($\frac{16}{15}$). One is therefore justified in assuming that these were also the ancient intervals. It will be found in later chapters that this postulate is of assistance in unraveling the meaning of the old text-books. Now, the sruti between four srutis and three srutis is $\frac{81}{80}$, while that which lies between the latter interval and the semitone is $\frac{25}{24}$. So long as it is understood that the srutis were never equal, no great object is gained by measuring them individually. It was, however, a convenient terminology, and still is so, to distinguish the major-tone, minor-tone and semitone by the number of srutis they contain. The twenty-two notes adopted in the Indian harmonium have this merit, that they conform in this respect to ancient usage; it will be found that every major-tone obtainable from them consists of four srutis,[1] every minor-tone of three srutis, and every semitone of two srutis.

**The Grâmas and Jâtis of the ancient system.**

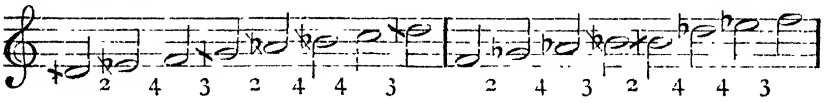
It is impossible to grasp the facts of Indian intonation without a knowledge of the two principal Grâmas, the Shadj Grâma and the Madhyam Grâma. The Gândhâra Grâma is not in use, and need not be discussed here; but it is a mistake to suppose that the other two Grâmas are also to be regarded merely as objects of antiquarian interest. Writers who treat of the Greek modes and the Church modes, and composers who make collections of Folk-songs, generally fail to take adequate notice of this fundamental branch of intonation. The same tendency is unfortunately at work in India. The ancient Indian theory was based upon two collections of notes, or "svaras," known as Grâmas. They differed in this respect, that the pancham was in one flatter

[1] There are two exceptions: the major-tone between srutis 3 and 6, and srutis 16 and 19; but these intervals are rarely used, if at all.

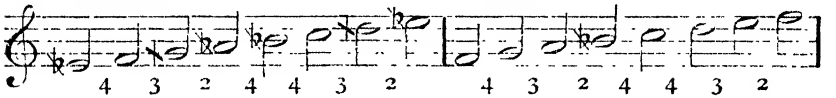
by one sruti. Until one of the notes was chosen as a starting-point, they were Grâmas and nothing more; the lowest note being chosen to sing from, a Murchhana named after that note was produced. For a scale or mode which was to become the basis of a musical composition, more was required, namely, the harmonic relationship given by the Vâdi and Samvâdi, and the stability given by a fixed initial note (Graha) and final note (Nyâs). The initial note appears also to have been the drone or pedal note. The Vâdi and Samvâdi corresponded very nearly to the final and dominant of the Church modes; they were invariably a fifth or a fourth apart (never a third as in some of the Plagal modes), and, as alternative Vâdis and Samvâdis were allotted to each Jâti, it is probable that a kind of modulation was allowed, this being more permissible in a system which required a constant fixed drone accompaniment. The simplest modes formed upon the plan thus briefly described were called "Shuddh Jâtis." There was one for every degree of the scale; the "Shuddh Jâtis" were distinguished from others in having the initial and final and chief note, or prevailing note of a composition, the same as the "nâma-svara," or that note which gave its name to the Jâti; of the seven Shuddh Jâtis, four belonged to the Shadj Grâma and three to the Madhyam Grâma. As a knowledge of the Shuddh Jâtis is of great assistance to the student of the Indian scales, they are here given, first in their primitive form, and then in their modern position, based upon shadj; it will be observed that their names are derived from those of the initial notes. The sruti-intervals between the different degrees are shown in each case in figures.

THE SHADJ GRÂMA.

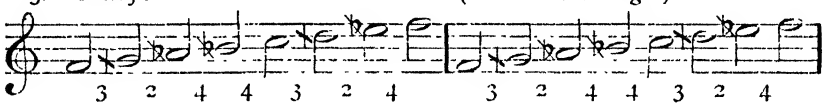
1. Dhaivati.



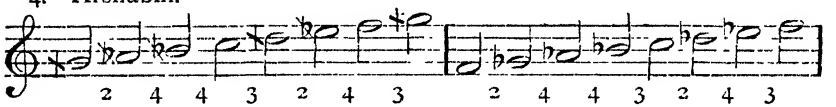

2. Naishâdi. (Bihâg.)




3. Shâdji. (Kâfi or Sri-Râga.)

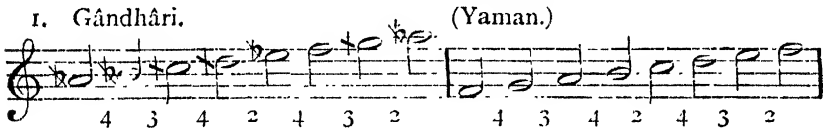



4. Arshabhi.[1]

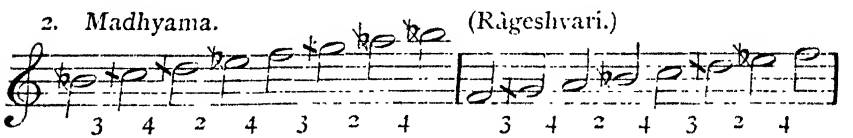



THE MADHYAM GRÂMA.

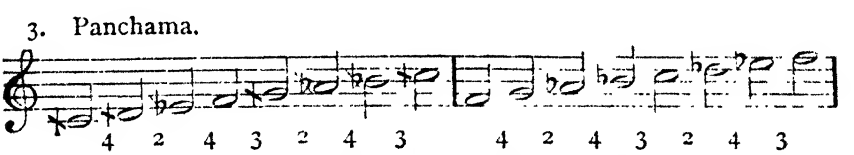
1. Gândhâri. (Yaman.)




2. Madhyama. (Râgeshvari.)




3. Panchama.
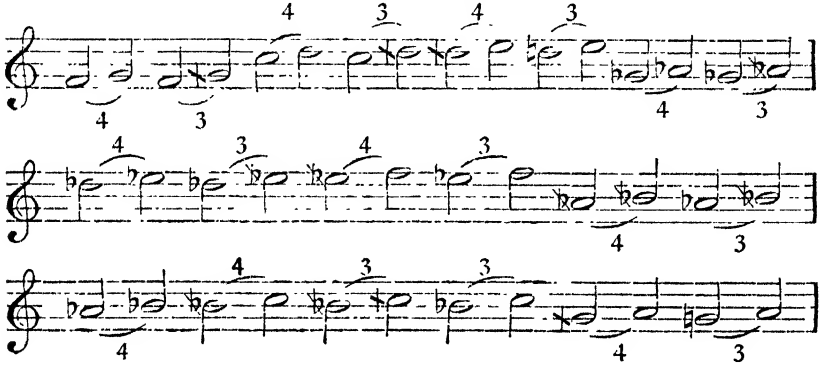



**Explanation of accidentals and comparison of the two Grâmas.**

The following quotation from Bharata (Nâtya Shâstra, Ch. 28, Commentary on verse 25) may serve as a text upon which to hang an explanation of the bewildering number of accidentals used: "Pa is lowered one sruti in the Madhyam Grâma. The interval passed over in raising or lowering pa by one sruti is the measure of a sruti." Although
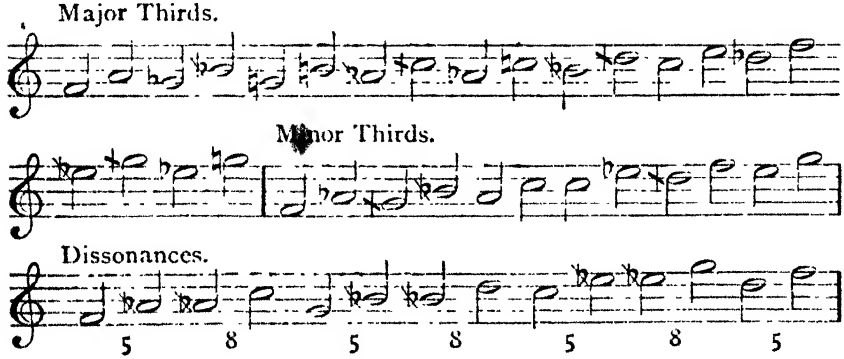
[1] If the text of the Sangit Ratnâkar is followed literally, the scale here given would be in the higher or târ octave, the usual (madhya) octave being an octave lower.

the interval of two srutis is not double that of one sruti, nor the interval of four srutis double that of two, although in fact Bharata and his successors laboured under a misapprehension in considering that the sruti was a unit by which intervals could be exactly measured, yet the Indian musician had, and still has, a definite idea of what he means when he says a note is lowered or raised by a sruti. His idea of a sruti is $\frac{81}{80}$, the difference between the major tone and minor tone. The descending line used in the accidentals ♭ and 𝄫 always implies a descent by this interval of $\frac{81}{80}$. To make this clear, the following collection of major tones and minor tones is given :—

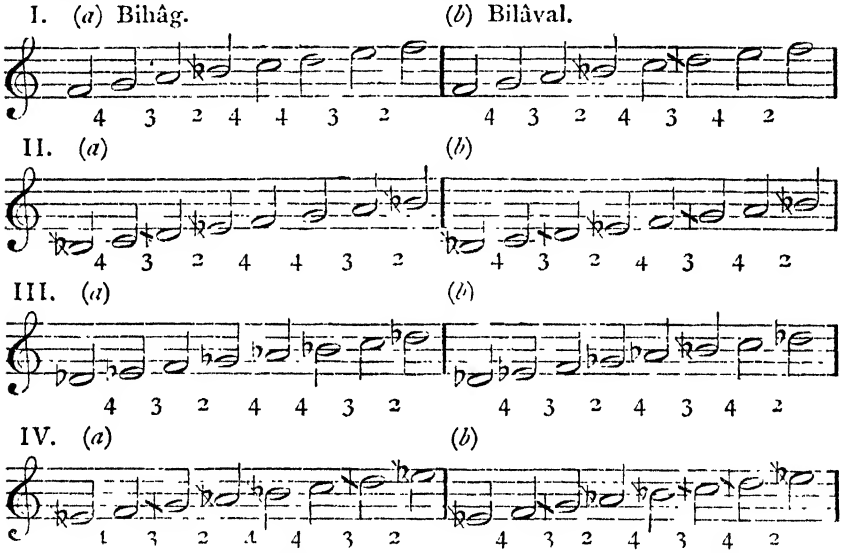


The figure 4 denotes a four-sruti interval, and 3 a three-sruti interval. The tivra sign ♯ is used in the manner above explained.

To enable the reader to distinguish with facility the consonant intervals of 7 srutis (the major-third, $\frac{9}{4}$) and 6 srutis (the minor-third, $\frac{6}{5}$) from the discordant intervals of 8 srutis ($\frac{256}{243}$) and 5 srutis ($\frac{32}{27}$), the following collection of intervals should prove useful :—



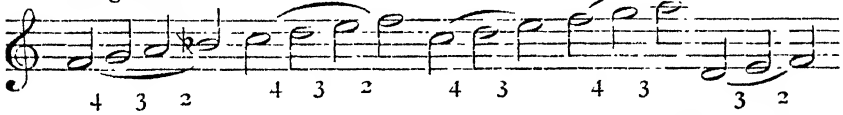
The Indian reader is probably familiar with the scales of Râgas Bihâg and Bilâval, although he may not perhaps have realized that the dhaivat of the latter is one sruti lower; the notes of Bihâg are sâ and pa shuddh, ma komal, and the rest tivra, while those of Bilâval have dhaivat madhya (♮) instead of tivra (♯). These two scales are here given side by side, first starting from shadj, and then in three transpositions from ma ♮, dha ♭, and ni ♮ respectively. The intervals are shown in srutis as before.



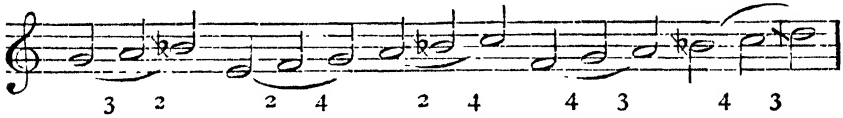

The scales marked (*a*) are all exactly the same; so also are those marked (*b*). The effect of lowering the sixth note in the (*b*) class is to change the harmonic structure of the scale. The sixth note, from being merely a relation (or in harmony with) the second, is transformed into a relation of the first and fourth notes of the scale. In Bilâval, for instance, dhaivat harmonizes as a minor third below sâ and a major third above madhyam; whereas in Bihâg it is discordant with both sâ and ma, and a fifth above ri. Scale II. (*b*) introduces the madhya rishabh, the note which is used with such telling effect in Deshkâr Râga. This note is in tune with ni ♮ and ma ♮, whereby it is to be distinguished from ri tivra. Scale III. (*a*) contains the high or "chadh" madhyam (ma ♭). This note is used in Dhâni Râga amongst others; it is a rare note in modern music, because the sâ drone strongly attracts

the perfect fourth (ma ♮). Scales IV. (*a*) and (*b*) are composed of the shuddh notes of the ancient Shadj and Madhyam Grâmas. It will be obvious that the flattening of pa by one sruti is precisely the same thing as the difference in harmonic structure which distinguishes Bilâval from Bihâg. Lest it should be supposed that because Indian music does not employ harmony in the Western manner, considerations drawn from the study of harmonic intervals are of less importance than in the West, the following scale passages which are divisible into groups (as shown by brackets) of identical harmonic structure, are taken from the scales under discussion. The laws of harmony have been, in the East as in the West, the chief determining factor in the evolution of musical scales.

Bihâg Scale.



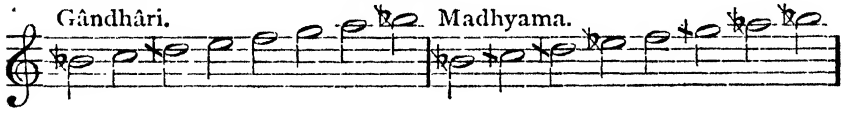

Bilâval Scale.



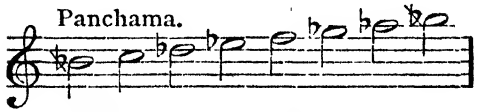

Returning, after this digression, to the Shuddh Jâtis, the first remark one is inclined to make is that it is singular that so few of the modern scales are there. Three common scales, Bihâg, Kâfi, and Yaman, are comprised among the Jâtis, and one rarer one, Râgeshvari. It may be added as a possible explanation, that from Ratnâkar (Prakaran 4, verse 15) [1] it may perhaps be inferred that the Madhyam Grâma Jâtis should be taken from ma and not from sâ, thus—

**The Jâtis and modern scales compared.**

Gândhâri. Madhyama.



Panchama.

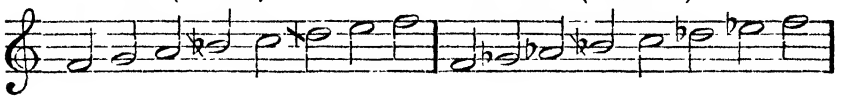


Adding the sâ drone would have the effect of compelling the ear to refer the scale to shadj as a starting-point. This gives for Gândhâri and Panchama, the following familiar

[1] See p. 58.

scales; but the Madhyama scale must be discarded, as modern practice does not allow a flattened pa.

Gândhâri (Bilâval). Panchama (Bahiravi).
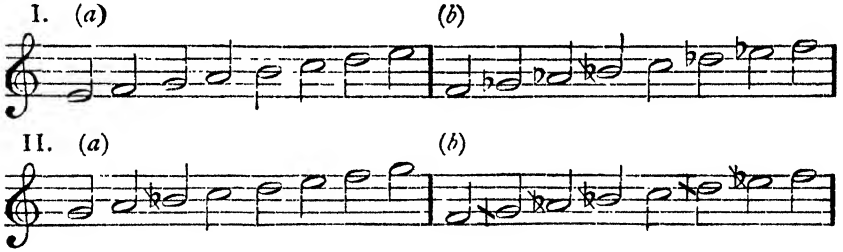


This method therefore gives five well-known scales in place of three. Yaman and Kalyân may also have been derived from the Shuddh Jâti Naishâdi by sharpening of the fourth, that is to say, by the not uncommon change from shuddh ga to antara ga, a change which will be fully explained later on. From the form of Panchama first given, the hexatonic scale of the uncommon Râga Dhâni, may have been derived. Dhaivati and Arshabhi must, however, be rejected, the former because the fifth note is really komal pancham and not to be tolerated nowadays in such a scale, and the latter because the high fourth is not now used except in the Râga Dhâni and possibly in some rare derivatives of the Râga Asâvari. The secret of these dissimilarities and anomalies will be explained more fully in later chapters. It lies in a difference of tuning. In olden practice the Chanterelle or drone strings were dha ♭ and ri ♭, and for convenience' sake all Jâtis were played from the pitch of one or the other of these two notes. The modern practice is to make sâ the chief pedal note, and to add above it pa or ma ♮ according to the nature of the scale. Assuming that, in the majority of ancient compositions, the scale was actually based upon ri ♭, the drone would be the fundamental note of the scale together with another note (dha ♭) a fourth below it; in other words, it would correspond to sâ over pa, whereas the modern practice is almost invariably to take the fifth as a drone, namely, pa upon sâ. If this radical change in the nature of the drone accompaniment did actually take place, it is sufficient to fully explain the discrepancies between the ancient and modern scales.

**The use of the word "Grâma" in relation to modern music.**

The next important observation to be made is that in modern music there are, strictly speaking, no Grâmas, although the difference between the two Grâmas is accurately exemplified in the scales of Bihâg and Bilâval. The history of the Indian scales may be divided into three periods, (1) the

Grâma period, (2) the Transition period, (3) the Modern period. In the first, all scales were played from the shuddh notes of the Grâmas ; in the second, in order to avoid changing the drone and re-tuning the tambura and drums, all scales were played from ri ♮ as a basis, but as far as possible the frets of the shuddh notes were employed, the wire being tuned up or down to bring the required initial note (graha svara) to the pitch of ri ♮ ; in the third, that is at the present time, all sense of the Grâmas has died out, shadj is looked upon as the starting-point of all scales, and the scales of the Râgas are regarded, with certain exceptions, as independent structures. Those exceptions, although of no great importance, are highly interesting. Yaman and Bahiravi, as has been seen, belong to the Madhyam Grâma, while Bihâg and Kâfi belong to the Shadj Grâma. This inter-relationship is exemplified in the common practice of playing these pairs of Râgas respectively from the same set of frets. Thus I. *a* below becomes I. *b* if the wire is tuned up by two srutis, and II. *a* becomes II. *b* if the wire is tuned down by four srutis.



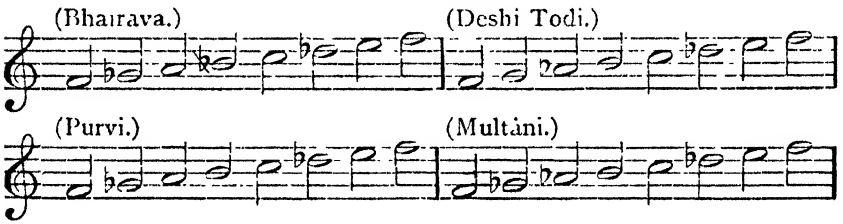

Indian music may be said, then, to have outgrown the Grâmas and the system of shuddh svaras. At the same time, a knowledge of the theory of the Grâmas is essential to the student of Indian music, and the word Grâma itself should prove a useful substitute for the Western and less appropriate term "diatonic," to designate scales which are derived from the shuddh notes of ancient India. The scales which have been discussed above may be referred to as the Grâma scales. They are distinguished from others by the fact that they contain three major-tones, two minor-tones, and two semitones.

In the music of Hindustan the Grâma scales hold the first place in point of number and popularity. Scales of less

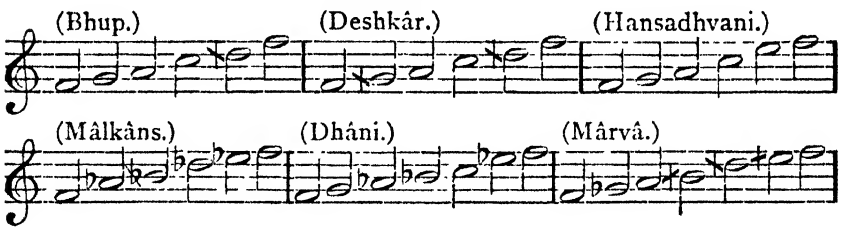
than seven notes, hexatonic or Shâdava, *i.e.* of six notes, and pentatonic or Odava, *i.e.* of five notes, may be regarded as abridgments of the complete scales to which they approximate. They will most of them be classed among the Grâma scales. Then came a very important class consisting of scales which comprise three or four semitones in place of two. Such scales are to be found also among the Folk-songs of Europe. They may not inappropriately be designated Chromatic scales. The following are examples of chromatic scales and transilient (hexatonic or pentatonic) scales :—

**Scales other than Grâma scales.**

CHROMATIC.




TRANSILIENT.

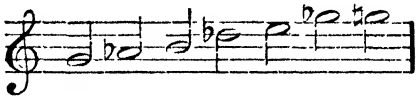



The names of the Râgas employing the scales given are written in brackets. The Bhup scale may be regarded as an abridgment of Bilâval, that of Deshkâr as an abridgment of Kâfi with the sharpened or chromatic third, Hansadhvani as derived from Bihâg, and Mâlkâns from Bahiravi. The last two have an individuality of their own. Dhâni is a Grâma-scale, while Mârvâ is an irregular scale of a kind not hitherto discussed in this chapter.

The affinity of the Mârvâ scale to the Chromatic scales above given is disguised by the Indian notation, which treats the fourth and sixth notes as "tartivra," whereas, harmonically speaking, they are komal

**Irregular scales.**

notes. Tartivra ma, being a fourth above komal ri, should really be called komal pa, and tartivra ni similarly komal sâ. Indian tradition is, however, bound up with a "solfa," or "Sârigama" system which allots one of the names sâ, ri, ga, ma, etc., to the notes of all scales for the purposes of singing. It has become part of that tradition in comparatively modern times to restrict the names sâ and pa to two fixed degrees of the scale. The real character of Mârvâ is made clear in the following transposition (beginning the scale from ri instead of sâ) :—



Respecting the intervals (other than semitones of two srutis) employed in the Chromatic scales, it will be found that the sruti system as a method of comparing them breaks down completely. The sruti system appears to have been applied in its inception to the Grâma scales only; when used in connection with other scales it leads to nothing but confusion. The intervals of the Bhairava scale expressed in ratios are—

$$\frac{16}{15},\ \frac{75}{64},\ \frac{16}{15},\ \frac{2}{8},\ \frac{16}{15},\ \frac{75}{64},\ \frac{16}{15},$$

while those of Mârvá are—

$$\frac{16}{15},\ \frac{75}{64},\ \frac{256}{225},\ \frac{75}{64},\ \frac{256}{225},\ \frac{135}{128},$$

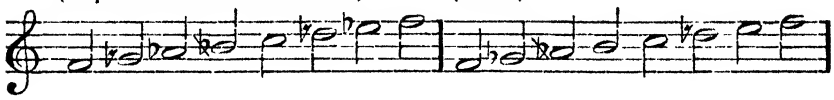
which approximate to

$$\frac{16}{15},\ \frac{7}{6},\ \frac{8}{7},\ \frac{7}{6},\ \frac{8}{7},\ \frac{135}{128},$$
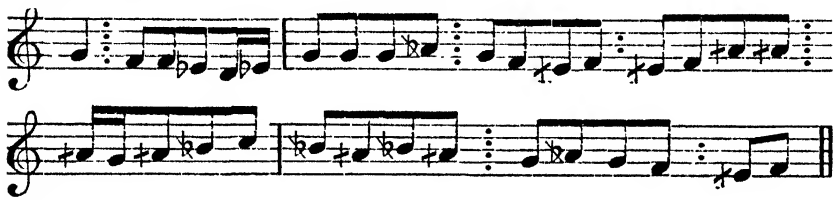
It may be that in this indirect manner, Indian musicians were led to incorporate septimal harmonies in their scales. Certain it is that in modern Indian music septimal intervals are employed with remarkable effect and in a considerable number of Râgas. There is a form of Asâvari which employs atikomal ri in place of tivra ri and atikomal dha in place of komal dha, a form of Todi which employs atikomal dha, and many others which there is no need to mention [1]—

[1] Amongst them may be specially noticed the Râga Yaman-Kalyan, which employs occasionally atikomal ma, followed by tivra ga (interval, $\frac{33}{32}$). The scale of the common form of Âsâvari is sâ, ri 𝄭, ga ♭; ma 𝄮, pa, dha ♭, ni ♭.

(Septimal form of Asâvari.) (Todi.)



Before leaving the Irregular scales, it will be of interest to give the following short passage in the Râga which the singer Abdul Karim calls Jayjayvanti—
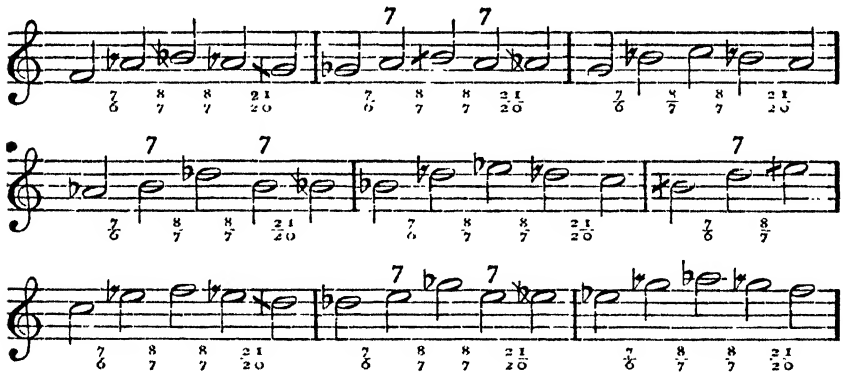


This example anticipates some features of the notation which are explained later on. To avoid misapprehension, the accidentals have been repeated before each note. The tartivra ni of Mârvâ is really komal sâ, as has been explained; the tartivra ga of this Râga bears approximately the same relationship to komal ma that the tartivra ni of Mârvâ does to sâ, but at the same time it is used frequently in conjunction with ri tivra and appears to be, harmonically speaking, what is known as high A, *i.e.* sharper than ga tivra by the interval $\frac{81}{80}$. It is possible to regard the tartivra ni of this Râga as "high E," instead of F ♭. The difference between these two notes is so small as to be hardly perceptible even to the trained ear of the Indian singer.

**Irregular scales further discussed.**

The reader may object that, as the above enumeration of the Indian srutis is admittedly not exhaustive, it is inadequate for the purpose in view. It is the writer's object, however, not to give a complete list of the Râgas known to any individual singer or singers, but to point out a method by which the scales of Râgas may be reduced to writing and classified. A slight consideration will show that all possible Grâma scales and Chromatic scales may be put together from the twenty-two srutis accepted in the Indian harmonium. The only ones omitted are those which depart from modern usage in having a flattened pa. It is only with regard to Irregular scales, therefore, that the above criticism has any force, and in their case it should be remembered that, although

the exuberant fancy of Indian composers has led to an extraordinary number and variety of scales, the Grâma scales and Chromatic scales greatly preponderate in point of universality and popular favour. Again, the Irregular scales, so far as the writer's experience goes, embody nothing new in principle, beyond the diminishing of the semitone exemplified in Jayjayvanti, and the use of the septimal intervals $\frac{7}{6}$, $\frac{8}{7}$ and $\frac{21}{20}$. It may be noted that the septimal diminished fifth $(\frac{7}{5})$ is apparently unknown to Indian musicians as a melodic interval. The possibilities opened up by these septimal harmonies are completely summed up below.[1] The figure 7 (above) signifies that the natural (or tivra) note on which it is placed is flattened in order to give a septimal interval.



Before concluding this chapter it will be convenient, now that the nature of harmonic intervals has been discussed, to show in what way they differ from the tempered tones and semitones of Europe. The European system of equal temperament is a modern creation; it originated in a desire to have unfettered liberty in the choice of keys and in modulating during the course of a composition from one key to another. For this purpose it was necessary that scales of exactly the same pattern should be available in every key. This object was attained by dividing the octave into twelve exactly equal intervals termed semitones. Instruments with fixed keys like

**The system of equal temperament.**

[1] The progressions avoided involve either a flattening of sâ or pa, or an incursion into "the sharp keys," both of which would be contrary to the genius of modern Indian music.

the organ, piano, and various wind instruments were constructed and tuned accordingly, and this artificial system has been assimilated to such an extent that singers and performers upon stringed instruments without frets such as the violin produce tempered music, in perfectly correct intonation, without being aware in many cases that an element of artificiality enters into their performances. Indian airs and European Folk-songs, when sung without harmonized accompaniment in tempered notes, are exceedingly harsh; the addition of harmony tends to disguise the defective intonation, because the mind which grasps the harmonies intended has the capacity of correcting small errors. But the harmonizing of Folk-songs and of Indian Râgas in tempered harmonies can never be recommended, except by those whose acquaintance with natural intervals is too slight for them fully to appreciate their superiority.

**Analysis of the tempered scale.**

In order to divide the octave $(\frac{2}{1})$ into two exactly equal intervals one must make use of the ratio $\frac{\sqrt{2}}{1}$, because this ratio when multiplied by itself makes the ratio of the octave. Similarly, in order to divide the octave into three equal parts the ratio required would be $\frac{\sqrt[3]{2}}{1}$. The tempered semitone, twelve of which make an octave, has therefore the ratio $\frac{\sqrt[12]{2}}{1}$. The same idea has been developed further in order to afford a simpler means than ratios of comparing intervals. Each semitone is divided in the same manner into a hundred imaginary intervals called cents. The cent is therefore the twelve-hundredth equal part of an octave, and a hundred cents make a tempered semitone, and two hundred cents a tempered tone. With the aid of logarithms it is a simple matter to turn ratios into cents; in this way it is discovered that the major-tone contains 204, the minor-tone 182, and the semitone 112. The practical advantage gained by this method is that intervals may be graphically compared (as in Appendix A), and the addition or subtraction of intervals simply means the addition or subtraction of the numbers of cents they contain, whereas it is necessary in the case of ratios to multiply and divide.

The demerits of the tempered scale as a vehicle for the expression of Indian musical thought may be summed up as follows :—

**Equal temperament unsuited to Indian music.**

1. The distinction between the interval of 4 srutis and that of 3 is obliterated. Bihâg is confused with Bilâval, and Bhup with Deshkâr, while it is impossible to give any idea of such Râgas as Kâfi, Bhimpalâshi, Râgeshvari.

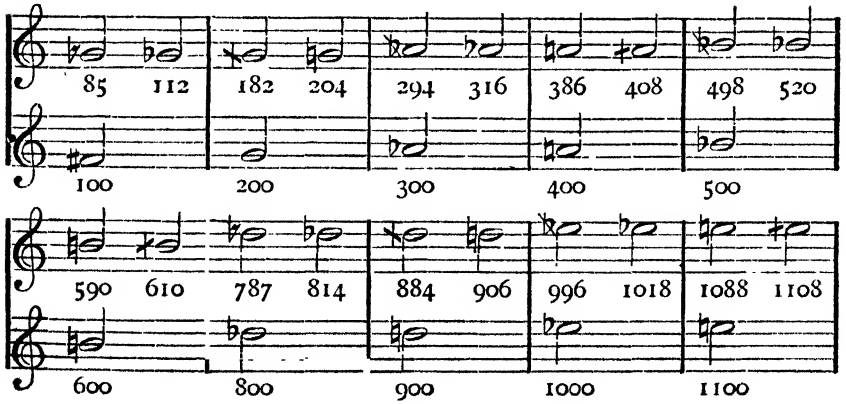
2. The atikomal and tartivra notes cannot be expressed.

3. All intervals are out of tune.

The minor-third is 300 cents instead of 316; the major-third 400 instead of 386; the fourth 500 instead of 498; and the fifth 700 instead of 702. A high degree of skill or training is not required to detect the errors in the thirds; they are flagrant; in fact, the minor-third is much nearer the dissonance of the third in Kâfi (sâ to ga ♭, 294 cents), and the major-third to the interval from ma ♭ to dha ♮, another dissonance, 408 cents.

**The ordinary Western notation equally unsuitable.**

One can only conclude that Indian writers who openly advocate the use of tempered instruments are unaware of their utter inadequacy to give any idea of Indian intonation. A word of warning appears to be needed by others, who, although not in favour of tempered music, are ensnared by Western notation. They should remember that Western notation, without drastic changes such as those here recommended, is as detrimental to their music as the tempered harmonium. It is a tempered notation. The extent to which it confuses the Indian intervals may be seen from the following :—



Each of the tempered notes shown below takes the place of two; the extent of error involved in the compromise is evident from the figures of cents given. The keys of Western music with their key-signatures are part and parcel of the tempered system, and are not suited to the Indian Râgas. Some of the latter might be written under a key-signature adapted from those in use in Europe, but the majority could not, and nothing could be gained thereby. A great deal of Mr. Mudliar's book (alluded to in the previous chapter) is taken up with a lengthy description of the keys and key-signatures of European music. The information is of no value except to those who can take pleasure in hearing an approximation to Indian airs played upon the tempered harmonium.

## CHAPTER III

### THE STAFF NOTATION (*continued*)

IT is now necessary to explain how Indian music may be represented accurately and in detail by the Staff Notation. In doing this the author will have to go over ground which has already been traversed by other writers. Where he has struck out a line of his own, his object has been to secure the maximum of simplicity with the minimum of innovation.

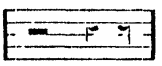
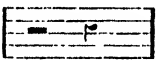
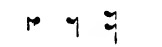
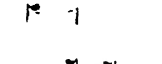
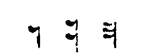
As already explained, sound is represented by notes. Silence is shown by what are called "rests." The duration of silence (vishrânti) or sound (svara) is indicated by the shape of the rests or notes used.

| Note. | Corresponding rest. | English name. | Indian equivalent in mâtras. |
|---|---|---|---|
|  |  | Breve | 8 |
|  |  | Semibreve | 4 |
|  |  | Minim | 2 |
|  |  | Crotchet | 1 |
|  |  | Quaver | $\frac{1}{2}$ |
|  |  | Semiquaver | $\frac{1}{4}$ |
|  |  | Demi-semiquaver | $\frac{1}{8}$ |
|  |  | Semi-demi-semiquaver | $\frac{1}{16}$ |

There are three degrees of speed in Indian music: *vilambit*, or slow, *madhya*, or moderate, and *druta*, or fast. Whatever the speed is, each measure (avarta) consists of a fixed number of units of duration called mâtras. The *mâtra* in madhya time will be represented by the note known as the crotchet (♩). In slow time it will be the minim (𝅗𝅥), and in fast time the quaver (♪). The relative values of notes and rests and their equivalents in mâtras of madhya time are as in the preceding page.

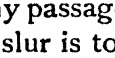
Smaller notes and rests still may be obtained by adding more hooks to the stem.

A *dot* after a note makes it half as long again. The use of dots with rests is not recommended. Two dots make a note $1 + \frac{1}{2} + \frac{1}{4}$ or $1\frac{3}{4}$ the length. Thus—

| Note. | Corresponding rests. | Indian equivalent in mâtras. |
|---|---|---|
| 𝅗𝅥.. |  | $3\frac{1}{2}$ |
| 𝅗𝅥. |  | 3 |
| ♩.. |  | $1\frac{3}{4}$ |
| ♩. |  | $1\frac{1}{2}$ |
| ♪.. |  | $\frac{7}{8}$ |
| ♪. |  | $\frac{3}{4}$ |

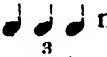
Just as rests are combined to make up the value required, notes may be combined where it is necessary or more convenient to do so in order to make the phrasing or grouping of notes clearer. In this case the *tie* or *bind* is used. Two notes of the same pitch joined by a tie are played as one note of the combined value of the two, thus: ♩‿♩ = 2 mâtras; 𝅗𝅥‿♪ = $2\frac{1}{2}$ mâtras; ♩‿♪ = $1\frac{1}{1}$ mâtras; ♩‿𝅘𝅥𝅯 = $1\frac{1}{8}$ mâtras; ♪‿♪ = 1 mâtra.

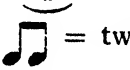
The *grouping of notes* is a guide to the accent, the first note of the group being generally more accented than the following ones. It is also, when used with a figure and slur, a means of showing the division of the mâtra (or other larger or smaller unit of duration) into a number of equal parts which is not a multiple of two. *Grouping* is effected by joining the hooks of notes, thus  . *Grouping by slurs* may extend over any passage of melody ; it means that the passage covered by the slur is to be played *legato*, *i.e.* smoothly, as one phrase. *Grouping* to show a division of the time-unit into equal parts is effected in the following manner :—

(1)  means 3 notes equal in duration to 2, *i.e.* each $\frac{2}{3}$ mâtra.

(2)  = two notes of $\frac{1}{2}$ mâtra each.

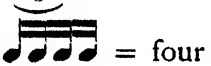
(3)  = three notes of $\frac{1}{3}$ mâtra each.

(4)  = four notes of $\frac{1}{4}$ mâtra each.

(5)  = five notes of $\frac{1}{5}$ mâtra each.

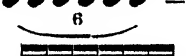
(6)  = six notes of $\frac{1}{6}$ mâtra each.

(7)  = seven notes of $\frac{1}{7}$ mâtra each.

(8)  = eight notes of $\frac{1}{8}$ mâtra each.

(9)  = nine notes of $\frac{1}{9}$ mâtra each.
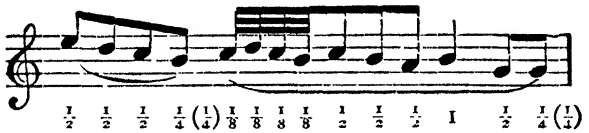
In No. 6 the accent comes on the first, third, and fifth notes of the group. If two accents only are desired, the grouping is effected thus :—

(6)  Here each group totals $\frac{1}{2}$ mâtra.
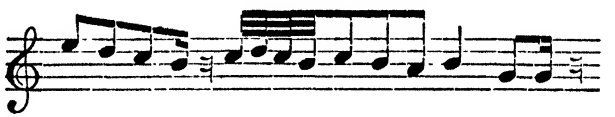
It will be noticed that the same number of hooks is retained from one multiple of two in the dividend of the fraction, which shows what

proportion each note bears to the unit, to the next multiple of two. One hook is used for half-mâtras and third mâtras; two hooks for fourths, fifths, sixths, sevenths; three hooks for eighths, ninths, etc.

*Grouping by Slurs.*—To avoid an unnecessary multiplicity of small rests, it is laid down that the last note of a *phrase* grouped by a slur is to be played as if of half the length shown, the remaining half being a rest. This rule applies where the note is a hooked one; in the case of longer notes, it is better to show the exact amount of rest desired. The curved line exactly similar to a tie used in the groupings below is designated a slur. It may be used of any length to show the phrasing or legato grouping of a melody.
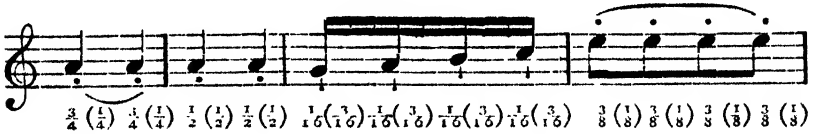


Below each note is written its mâtra-value, rests being shown in brackets. The manner in which the four demi-semiquavers are grouped with the three following quavers should be noted. A more cumbrous way of writing this passage would be—



It is clear that the last note of a phrase must be cut off or detached from what follows; hence the use of a slur implies a short rest. The rule above stated as to the time-value of such rests is founded on the practice of Indian singers.
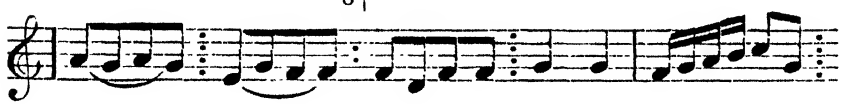
Sometimes notes which do not come at the end of a legato phrase are played in a detached manner. This is called *staccato.* There are three degrees of staccato, shown by (1) a slur and dots above or beneath the notes, (2) by dots alone, (3) by dashes. The effect of each is here shown in the same manner as above by writing the "laya" or mâtra-values in fractions.
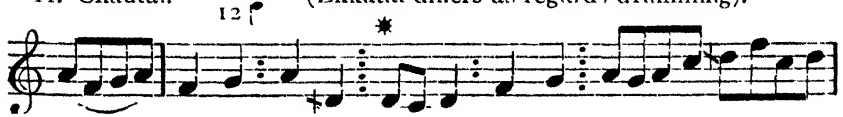


*Emphasis* or accent is sometimes shown by grouping, as above stated; it also follows from the nature of the measure, a subject to be dealt with; occasionally a special emphasis is given to a particular note apart from that which comes naturally from the measure or the phrasing. Emphasis of this kind is denoted by the signs $\wedge$ or $>$ placed above or below the note in question. When very strong emphasis is required the letters *Sf* are used.

Music set to time is divided into *measures* (âvartas), which are marked off by upright lines or *bars*. The measure consists of a stated number of mâtras with accents occurring at regular intervals. Accents are: strong (sam), medium (tâli), or weak (khâl). The *strong accent* follows immediately after the bar; the medium accent follows the dotted bar; and the weak accent follows the dotted half-bar. The character of the measure may be shown by a time signature. A very good form of signature is one adopted by Mr. H. P. Krishnarao, of Mysore ("First Steps in Hindu Music," Weekes & Co., London). Above are noted the mâtras upon which the chief accents fall, and below the number of mâtras in a measure and their time-value. Thus $\frac{1.5.7}{8\,\mathrm{crotchets}}$ means that there are eight mâtras represented by crotchets in the measure, and that the accent falls on the 1st, 5th, and 7th. The addition of subsidiary dotted bars is useful, as they show at a glance the phrasing of the melody. The measures in most frequent use are—

I. Aditâl, tritâl or tintâl. $\frac{1.3.7}{8\,\mathrm{crotchets}}$ (Panjâbi is slower).
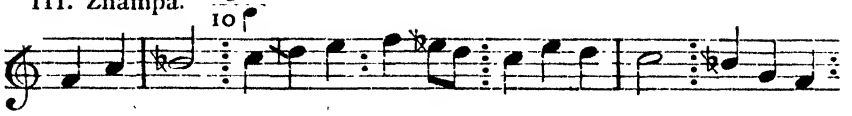


II. Chautâl. $\frac{1.5.9.11}{12\,\mathrm{crotchets}}$ (Ekkâtâl differs as regards drumming).
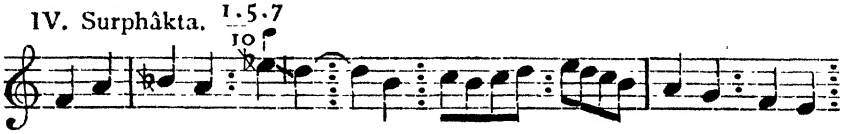


* The dha is ♮ like the preceding one. See the paragraph below on "Accidentals."

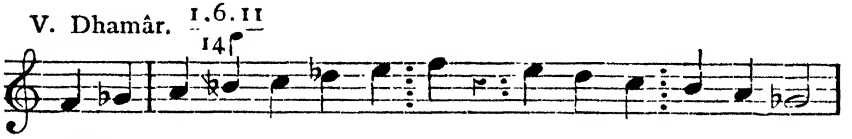
III. Zhampâ. 1.3.8
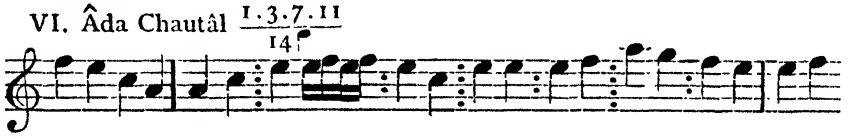


IV. Surphâkta. 1.5.7
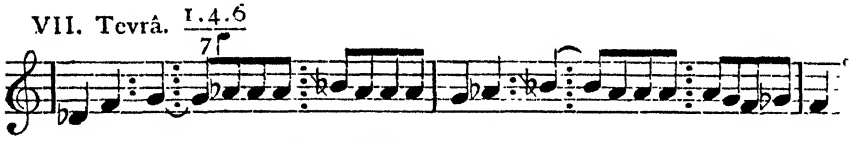


V. Dhamâr. 1.6.11
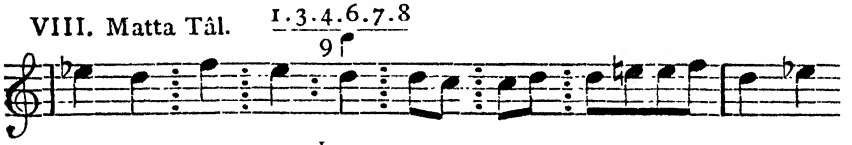


VI. Âda Chautâl 1.3.7.11
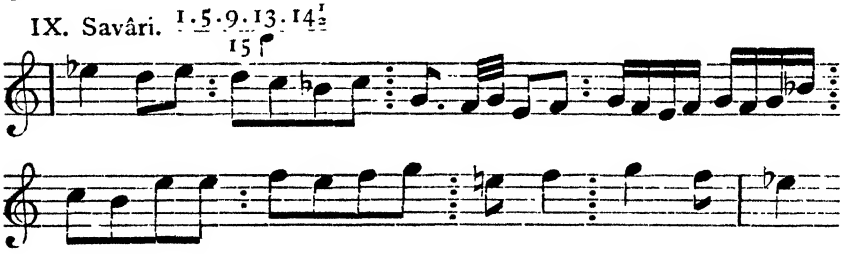


VII. Tevrâ. 1.4.6
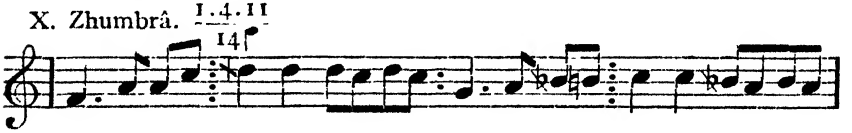


VIII. Matta Tâl. 1.3.4.6.7.8
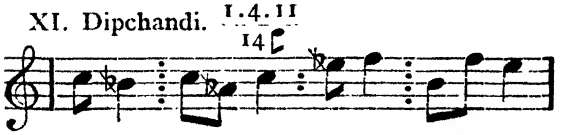


IX. Savâri. 1.5.9.13.14½



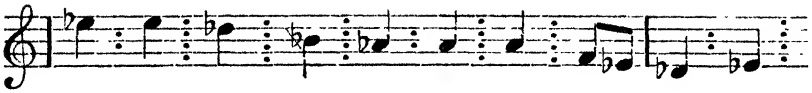
X. Zhumbrâ. 1.4.11



XI. Dipchandi. 1.4.11
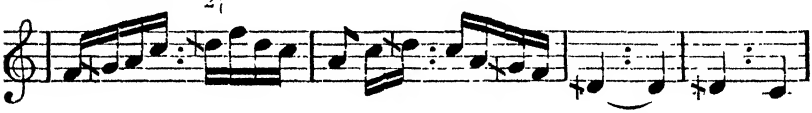


XII. Dhumâli.* 1·3·4·5·7·8



XIII. Dâdrâ. I



XIV. Keravâ. I

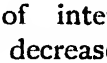


The sign placed before a note, which shows which sruti of that svara is to be used, is called an *accidental.* Where the same sruti occurs more than once in an âvarta, or measure, the accidental need be used once only. The object of this rule is to avoid an unnecessary number of accidentals.

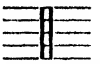
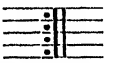
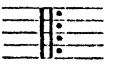
Thus, in Example IV., first complete bar, there are three komal madhyams, the accidental ♮ being used for the first only. If the second, however, had been tivra, and the third again komal, it would have been necessary to place the sign ♯ before the second, and ♮ before the third. It will be seen that the rule only applies where the sruti is not changed.
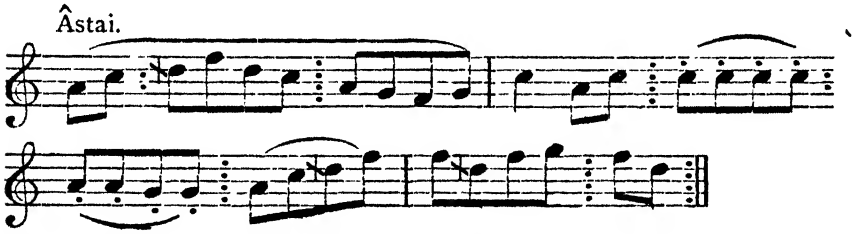
It is necessary to adopt terms and signs which will show the *intensity* or degree of loudness or softness of a composition. The following terms are in general use in European music; they represent fixed degrees of intensity:—

| Sign. | Term. | Rendering. |
|---|---|---|
| *pp* | pianissimo | very soft |
| *p* | piano | soft |
| *mp* | mezzo-piano | moderately soft |
| *mf* | mezzo-forte | moderately loud |
| *f* | forte | loud |
| *ff* | fortissimo | very loud |
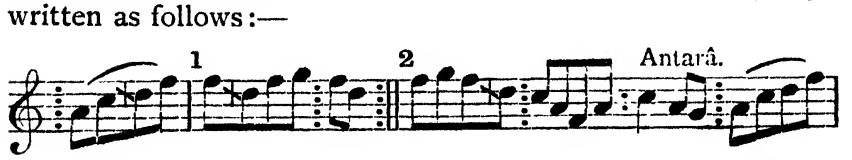
A gradual increase of intensity is shown by the sign  and a gradual decrease by 

[1] Dhumâli is not differentiated from Tintâl except in a certain kind of solemn music.
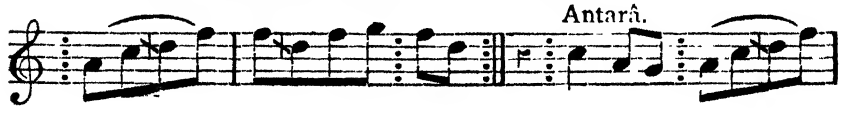
A *double-bar*  is used to mark the end of a composition or of any section thereof, such as the "âstai" or "antarâ." It may occur at the end of or at any place in a measure or "âvarta." When used with the sign 𝄐, which is known as the *pause*, thus  , it signifies the end of the whole composition. A double-bar with dots  is a direction that the composition is to be repeated up to that point, either (*a*) from the beginning, or (*b*) where the double-bar in this form  has been previously encountered, from that point. Double-bars should be so arranged that the integrity of the measures is preserved. In the following example, the first and third bars together form in the repeat one whole bar of eight mâtras.




Occasionally the last bar before the repeat sign is changed after the repetition, so as to lead to the next section. This is shown by the use of the numerals 1 and 2. The portion marked 1 is to be performed the first time, and at each repetition except the last. The part marked 2 is to be performed at the last repetition in substitution for 1, which is omitted. For instance, the last portion of the above example might be written as follows:—




In the next example there is no change.
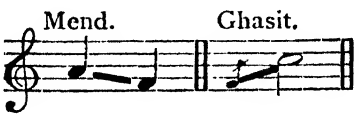


It is convenient to write such words as âstai and antarâ at the beginning of the appropriate sections. Such directions as "repeat âstai once or twice," when used with a double bar, will be easily understood and will save writing preceding sections again in full.

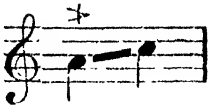
If it is required to repeat a composition from the beginning or from a certain point and this cannot be conveniently indicated by a double bar and dots, the directions "repeat from beginning" and "repeat from 𝄋" may be used respectively, the sign 𝄋 being placed over the point from which the repeat is to commence.

*Embellishments* or ornaments are much used in Indian music. With the exception of the mend and ghasit, they consist chiefly of short notes the time of which is taken out of that of the note which they adorn. These notes are sometimes "diatonic," that is to say, taken from the scale of the Râga, and sometimes what are generally spoken of as quarter-tones. The author makes no attempt to classify them or define them; it is sufficient for his purpose to describe those which require special signs to express them. Others may be represented by the actual notes and in the actual time by means of the signs and notes already described.
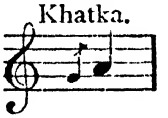
The *mend* is a glide from one note to another. So also is the *ghasit*, but they differ in this, that whereas the ghasit proceeds from a grace-note and is quick and somewhat violent, the mend passes over all intermediate sounds gently and is sometimes allowed to dwell for the briefest possible moment on the diatonic notes. Their signs are—




*Thok* is an ornament applied to the first note in a mend. It consists in attacking the note forcibly, blending it at the same time with the "quarter-tone" above. It is primarily an ornament obtained by plucking a string with emphasis while the left hand almost simultaneously stretches the string to one side. The sign here adopted is taken from the sign of emphasis (>).
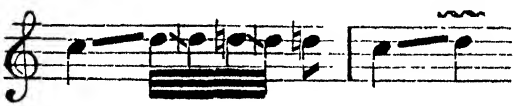


The *khatka* may be represented by grace-notes ; no special sign is needed. Grace-notes are minute in point of time ; they take their time out of that allotted to the note to which they are attached, and are represented by small notes. A single grace-note is usually cut through with a line as shown, in order to distinguish it from a peculiar kind of note known in European music as the "appoggiatura."




Two kinds of trill are in common use, *gamak* and bhelava. The first is somewhat like a "mordent" with quarter-tones ; it may be represented thus :—



*Bhelava* comes after a mend, and consists of a slow trill with the next higher or lower sruti. It resembles the vibrato.



The ordinary trill of Europe is performed in combination with the next note above in the scale, and is denoted by the sign *tr.*

The writer's acknowledgments are due to Abdul Karim, some of whose melodies [1] have been used or mutilated to serve as examples, and to Yeshvantrao Dinkar Bhramanâlkar, who has published in a kind of "tonic-solfa" notation several of Abdul Karim's melodies.[2]

[1] "Sangit Svaraprakâsh." Srirâmtatva-Prakâsh Printing Press, Belgaum.

[2] "Jain Bhajanâmrit Padyâvali." Printed at the Arya Bhushan Press, Poona.

# CHAPTER IV

## THE INTERPRETATION OF THE ANCIENT TEXT-BOOKS

THIS chapter will include annotated translations of the most important parts of the Nâtya Shâstra of Bharata, which is generally allotted to the fifth century A.D., and of the thirteenth-century text-book, the Sangit Ratnâkar of Sârangdev. The writer knows of no detailed exposition of Indian musical theory in any treatise except Bharata's Nâtya Shâstra, earlier than the Sangit Ratnâkar. Regarding later works, it may be said without fear of contradiction that the Ratnâkar has been consistently misunderstood by all succeeding authors.

To understand the two works named one must grasp two important facts, namely—

(1) That the system of tuning upon which they are based is that mentioned at p. 109 of Captain Day's "Music of Southern India." The chanterelle strings in such instruments as the vina and sitâr were dha ♭ (the bass note), and ri ♭ and ga ♮. The drone used was almost invariably dha ♭ and ri ♭ combined. These were probably the notes given by the tambura. The wire upon which the melody was played was ri ♭.

(2) The sruti was not an exact unit of measurement. Two srutis made a just semitone, three a minor-tone, and four a major-tone.

The evidence to establish the first of the facts mentioned is as follows:—

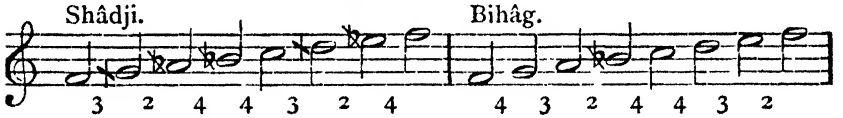
(1) Although the present writer has not been able to come across a vina-player who tunes his instrument in the method named, it is clear from Captain Day that the method survived until modern times in the Hindustâni school of music.

(2) The tuning method of Sârangdev could not have been the same as that now in vogue. Sâ is omitted in several of the hexatonic and pentatonic scales mentioned by him.

(3) The process of Grâma-Sâdhâran discussed below is almost sufficient in itself to prove that two of the open strings were tuned to ri ♭ and dha ♭.

(4) This is not, perhaps, a very strong inference, but the name shadj itself—born of the sixth—shows that shadj was not always the fundamental note of music as it is now, and is compatible with the assignment of a more prominent position to dhaivat, for shadj is six srutis removed from dhaivat.

(5) It will be found that it is quite unnecessary to make any verbal alterations or to do violence to the natural meaning of the text, if the two facts mentioned are accepted as a basis of interpretation. The general method adopted by modern Indian writers in dealing with the Ratnâkar, is either to quote passages which obviously have not the remotest application to the modern system, without any attempt at comment or explanation, or to distort the meaning so as to make it applicable. For instance, Rajah S.M. Tagore takes the scale of Bihâg as his shuddh scale (unconscious of the circumstance that Indian music has outgrown its "shuddh svaras"), and endeavours to fit it into the scale which Sârangdev calls Shâdji. The two scales are here shown side by side, with the sruti intervals below in figures—




Rajah S.M. Tagore's argument is apparently as follows: "Our scale of Bihâg must be the same as that of Shâdji. If we take the srutis of sâ which are four in number to be those above it instead of those which separate it from ni, the srutis allotted to each note work out the same. Hence it is reasonable to conclude that the srutis of a note are really those which separate it from the note above, and not from the note below. If there are any passages in the Sangit Ratnâkar which are opposed to this view, there must be some error in the text."

(6) There is a very significant passage in the Sangit

Ratnâkar which shows that even in his time there were rival schools in the matter of tuning. In Prakaran IV., verses 14, 15 are to the following effect: "Some say that the last six Murchhanas of the Shadj Grâma are got by putting each of the notes ni, dha, pa, ma, ga, ri, respectively on sâ. The same principle may be adopted in the Madhyam Grâma. That is to say, in place of the original first Murchhana, ma, pa, dha, ni, sâ, ri, ga, ma, is to be read ga, ma, pa, dha, ni, sâ, ri, ga, and so on."

This is the same as the modern system except that nowadays the Grâmas are not kept distinct, and the difference of pitch from sâ to ma is not used to distinguish one from the other.

### BHARATA: NÂTYA SHÂSTRA (CH. 28). *Text and Commentary.*

(Translated from the Bombay Edition)—Kâvya Mâla series, No. 42. Nirnaya Sâgar Press.

*Verse* 22.—There are seven svaras: shadj, rishabh, gândhâra, madhyam, pancham, dhaivat, and nishâd.

*Verse* 23.—They are of four kinds according to the number of srutis between them: Vâdi, Samvâdi, Anuvâdi, Vivâdi.
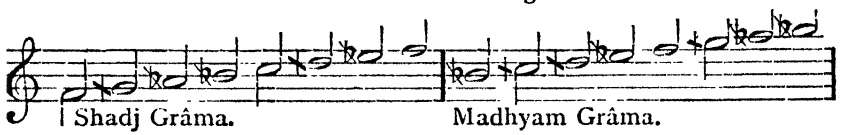
*Commentary.*—The "Ansha" svara is the same as the Vâdi. Svaras between which there is a distance of nine or thirteen srutis are Samvâdi to each other (examples are here given).

*Verse* 24.—In the Madhyam Grâma, pa and ri are Samvâdi; in the Shadj Grâma, sâ and pa.

*Commentary.*—Those are Vivâdi between which there is a distance of twenty srutis, *e.g.* ga and ri, ni and dha. The Vâdi, Samvâdi and Vivâdi thus established, the rest are called Anuvâdi. (A list of the Anuvâdi intervals is given.) The speaking note is called Vâdi; the note which clashes (with it) Vivâdi; the note which converses (with it) Samvâdi; the note which increases the beauty of the Râga, Anuvâdi. These svaras, when played, suffer slight modifications owing to differences in the wires and keyboard.

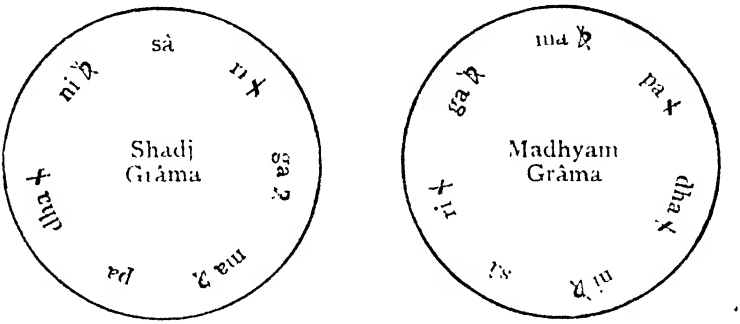
NOTE.—The chief note of a composition (ansha svara) according

to this passage, is the Vâdi. Its Samvâdi is either at a distance of a perfect fourth or fifth. The note at an interval of an octave less a semitone is Vivâdi, and the rest of the notes in the scale Anuvâdi. The classification has an element of harmony in it, but regard is had to the melodic rather than harmonic point of view. The reader will remember that the notes here dealt with are the following :—



Shadj Grâma. Madhyam Grâma.

The double-stemmed notes are the Vâdi and Samvâdi.




It would be more in consonance with Indian ideas to represent the Grâmas in the form of a closed circle ; as has already been pointed out, they are not regarded as scales.

## THE GRÂMAS.

There are two Grâmas, the Shadj Grâma and the Madhyam Grâma. Each is said to comprise twenty-two srutis.

*Verse* 25.—In the Shadj Grâma the srutis are arranged in the order following : 3, 2, 4, 4, 3, 2, 4.

*Commentary.*—Pa is lowered one sruti in the Madhyam Grâma. The interval passed over in raising or lowering pa by one sruti is the measure of a sruti.

NOTE.—This passage, and the difference in harmonic structure between the Grâmas, have been fully explained.[1] The ascending or descending line made use of in the accidentals means a difference of one sruti or $\frac{81}{80}$, except in two cases, ma ♯ and ni ♯, which should really be called pa ♭ and sâ ♭. From the passage "each is said to comprise twenty-two srutis," it might be argued with some show of reason that the existence of twenty-two srutis need not be taken to imply twenty-two

[1] Ch. II.

individual notes. The answer to this argument is found in the fact that individual names were allotted to the whole number of srutis.

*Verse* 26.—Sâ is of 4 srutis, ri of 3, ga of 2, ma of 4.

*Verse* 27.—Pa of 4, dha of 3, ni of 2. This is the Shadj Grâma.

*Verse* 28.—In the Madhyam Grâma, ma is of 4, pa of 3, dha of 4.

*Verse* 29.—Ni of 2, sâ of 4, ri of 3, ga of 2.

## MURCHHANAS.

There are 14 Murchhanas in the two Grâmas.

*Verse* 30.—The first is Uttarmandra, and starts from sâ; the second, Rajani from ni; the third, Uttarâyata from dha; the fourth, Shuddhshadjâ from pa; the fifth Matsarikritâ from ma.

*Verse* 31.—The sixth is Asvakrântâ from ga; the seventh Abhirudgatâ from ri. Such are the Murchhanas of the Shadj Grâma.

*Verse* 32.—In the Madhyam Grâma the Murchhanas are: Sauviri, Harinâsvâ, Kalopanatâ, Shuddhmadhyâ, Margi, Pauravi, Hrishyakâ.

*Verse* 33.—Such are the Murchhanas of the Madhyam Grâma. The starting notes are ma, ga, ri, sâ, ni, dha, pa.

These Murchhanas are of four descriptions: (1) those which are Sampurna (*i.e.* complete with seven notes); (2) (3) the Shâdava and Odava (*i.e.* hexatonic and pentatonic); (4) those which take the Sâdhâran (common) notes.

*Verse* 34.—When all seven notes are taken in order, the Murchhana is called Sampurna. When five or six notes are taken it becomes Odava or Shâdava.

*Verse* 35.—Sâdhâran Murchhanas are of two kinds: those which take the Kâkali Sâdhâran, and those which take the Antara Sâdhâran.

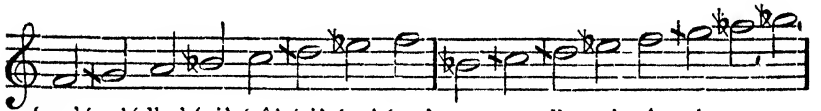
*Commentary.*—Each Murchhana is produced in two ways. Thus, in the Shadj Grâma, when ga, in the Murchhana or Grâma, is raised two srutis and made into dha. (So also in the Madhyam Grâma, Murchhanas assume two forms, (1) when the dha is lowered, (2) when the ni is raised.) This is calling the same thing by another name, because the sruti-intervals are not changed. The interval between pa and dha

is four srutis. Even so, raising gândhâra gives an interval of four srutis. The remaining svaras likewise become madhyamadi (*i.e.* relations of madhyam).

NOTE.—(1) Murchhana is a high-sounding name connoting little. In Sârangdev's time, as the examples given by him clearly show, the name of the Murchhana merely indicated the lower compass of a composition. It would perhaps have been more logical to treat the subject of "Sâdhâran" under the head of Jâtis. However, Sârangdev also deals with it under the section relating to Murchhanas.

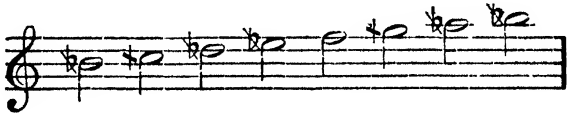
(2) The Kâkali Sâdhâran was ni ♮; the Antara Sâdhâran ga ♮. They appear to have been employed as alternative notes to the shuddh ones for melodic effect.

(3) The commentary below verse 35 has hitherto proved a stumbling-block to students. The brackets have been added by the present writer. They enclose a sentence which is to be separated from the rest of the text, as it is merely a digression by way of analogy. Ga is raised two srutis, that is to ga ♮, and becomes "dha." That means that the scale arrived at is at once realized as in the Madhyam Grâma, if ga is called dha.

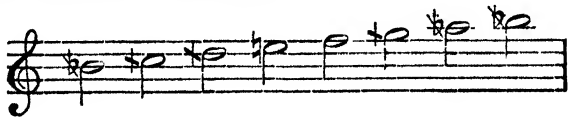



The scale arrived at by change of ga is that on the left; the one on the right is the first Murchhana of the Madhyam Grâma. It will be seen that, except in point of pitch, the two scales are identical.

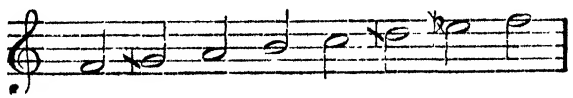
Again, lowering the dha in the Madhyam Grâma gives—



which is the first Murchhana of the Shadj Grâma transposed a fourth higher. If the reader will work out the ratios for himself, he will find that this is so. The inclined line in all cases means lowered by $\frac{81}{80}$. Raising the ni of the Madhyam Grâma gives



which, transposed, is the following:—



This is an interesting scale; tivra ma must be what is known in Europe as an auxiliary note, that is auxiliary to pa, from which it would not be separated. The reader may ask, with respect to the first two of the scales above, why the lowering of pa should not have been considered sufficient for the change of Grâmas without the use of dha komal and antara ga. The writer thinks that the practice originated partly from convenience of pitch, and partly to suit the drone of the open strings. The question will be more fully discussed in treating of the Ratnâkar Jâtis. [The first scale gives the Jâti Panchami when ri ♮ (an open string) is taken as the starting-point.]

Nothing would be gained by transcribing further passages from Bharata. His Jâtis are the same as Sârangdev's.

## THE SANGIT RATNAKAR.

### (*Anandâshrama Series, Poona*).

### SVARÂDHYÂYA (PRAKARAN 3).

*Verses* 3 to 11 are taken up with an attempt to explain the phenomena of sound.

*Verse* 12.—Take two vinas with 22 wires each and tune as follows: Let the first wire give the lowest possible note, the next a note a little higher and so on, so that between the notes given by any two adjacent wires a third note is impossible.

*Verses* 13 *to* 16.—These successive notes are the srutis. Sâ will stand on the fourth wire, being a svara of four srutis; ri will be on the third wire counting from the fifth; ga, which has only two srutis, will fall on the second, counting from the eighth; ma, being of four srutis, on the fourth, counting from the tenth; pa on the fourth, counting from the fourteenth; dha on the third after pa; ni on the second after dha; so ni will fall on the twenty-second sruti.

NOTE.—Verses 24 to 38 are taken up with the various names of the svaras and srutis. These names are to be found on p. 77, below. As regards diptâ, âyâta, etc., the commentator, Kallinâth, says, "It is said that this classification is based upon the effects which the srutis are supposed to produce."

*Verse* 40.—Thus are produced the seven notes of the mandra saptak (lowest octave or chest register); the seven

notes of the madhya (middle octave or throat register) ; and the seven notes of the târ saptak (highest octave or head register). These seven notes are called the shuddh svaras.

NOTE.—The notes are those of the Shadj Grâma (p. 50).

*Verse* 41.—When the shuddh svaras change their places among the srutis, they become vikrit svaras. There are 12 vikrits.

*Verses* 42, 43.—Sâ has two vikrit positions—Chyut and Achyut. In both it is of two srutis. It becomes Chyut when ni takes its first sruti and changes to kaishik ni. Becoming Chyut, it leaves its unused (fourth) sruti to ri ; thereby ri becomes vikrit because its distance from sâ is increased.

Sâ becomes Achyut (not fallen or unmoved) when ni is raised two srutis and made kâkali ni.

So, when ni becomes a svara of three srutis, by taking one from sâ, sâ is lowered one sruti, and becomes Chyut ; when ni becomes a svara of four srutis, by taking two from sâ, sâ becomes Achyut.

*Verse* 44.—Sâdharan and Antara are the two vikrit states of gâ ; Sâdharan of three srutis and Antara of four srutis.

*Verse* 45.—Ma, like sâ, has two vikrit conditions, Chyut and Achyut. When ga takes its first sruti, ma, in order to stand at a distance of two srutis from this Sâdharan ga, becomes Chyut ; again, when ga is raised to the second sruti of ma, becoming Antara, ma stands in its original place, but is called Achyut. It has lost two srutis, and so has become vikrit.

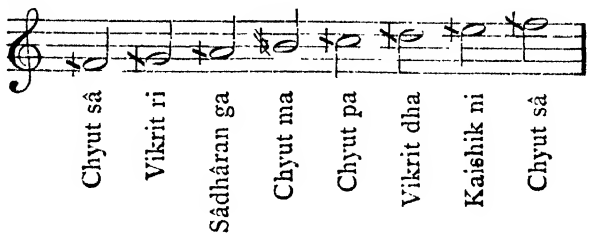
*Verse* 46.—Pa also has two vikrits. First, when it becomes a shuddh svara of the Madhyam Grâma ; secondly, it will become Chyut or Kaishik, when ma, the preceding note, is Chyut. It must fall one sruti to keep four srutis from Chyut ma. When pa becomes Kaishik, its last sruti goes to dha and makes dha vikrit.

*Verse* 47.—When ni takes the first sruti of sâ, it is Kaishik ; and when it takes two, it is Kâkali. These are the two vikrits of ni.

Such are the twelve vikrits. The total of shuddh and vikrit svaras is nineteen.

NOTE.—The above classification of vikrits is inexact and confused.

It was probably in vogue among musicians, and Sârangdev took it as he found it. Out of the twelve vikrits, seven, namely, chyut sâ, ma and pa, antara and sâdhâran ga, kaishik and kâkali ni, are new ; the rest are old svaras with new names. When chyut sâ, ma and pa are made use of, the scale assumes the form here given :—




These changes (it is important to notice that the only notes which escape flattening or raising are ri and dha) are known as *Grâma-Sâdhâran.* The real sâdhâran ga and kaishik ni, corresponding to the modern Karnatic notes of those names, are to be seen in the Gândhâra Grâma (see below). Here ga and ni become of three srutis, *i.e.* a minor-tone removed from ri and dha respectively. They are ga ♮ and ni ♮ as shown, and not ga ♭ and ni ♭. The confusion of nomenclature is due to the theory of the equality of the srutis. The inclined lines all mean a flattening by $\frac{81}{80}$. If one is removed from each note of the scale, that of Bihâg results, of which, as has been pointed out, Kâfi is the mode of the second. In other words, the above collection of notes taken from ri ♮ to ri ♮ gives the Jâti known as Shâdji (to be explained later). Grâma-Sâdhâran was a tuning device adopted to enable the performer to play Shâdji to a ri ♮ drone.

The lowering of pa in the Madhyam Grâma has already been explained. The manner in which antara ga and kâkali ni are used is dealt with under the head "Sâdhâran." Achyut is merely a fanciful epithet.

*Verse* 48.—(Gives the names of animals which utter the shuddh notes.)

NOTE.—This is interesting merely as showing that there was some idea, as there is to-day also, of absolute pitch.

*Verses* 49, 50.—Svaras are divided into four classes—Vâdi, Samvâdi, Anuvâdi, Vivâdi. The note which occurs most frequently in a song is the Vâdi.

*Verse* 51.—Samvâdi svaras are those between which are eight or twelve srutis.

Ni and ga are Vivâdi (discordant) with all others; in other words, ni and ga are respectively Vivâdi with ri and dha; ri and dha are respectively Vivâdi with ga and ni.

Svaras which are neither Vâdi, Samvâdi, nor Vivâdi are called Anuvâdi.

NOTE.—Ni and ri shuddh are not Vivâdi; perhaps the author had in mind ni kâkali. Even then his opinion conflicts with Bharata. It will be noted that to have eight or twelve srutis between, means intervals of nine and thirteen srutis respectively.

There is nothing important in verses 52 to 60.

## THE CHAPTER ON GRÂMAS AND MURCHHANAS (PRAKARAN 4).

*Verse* 1.—A Grâma is a collection of svaras. It is the foundation upon which Murchhanas are built. There are only two Grâmas in this world. The chief Grâma is the Shadj Grâma.

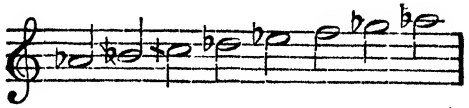
*Verse* 2.—The other Grâma is the Madhyam Grâma. When pancham stands on its proper fourth sruti, that is the Shadj Grâma arrangement of svaras.

*Verse* 3.—When pancham is lowered one sruti and stands on its third sruti, that is the Madhyan Grâma. To express it in another way, in the Shadj Grâma, dhaivat is of three srutis, and in the Madhyam Grâma, it is of four srutis.

*Verse* 4.—When gândhâra takes one sruti from ri, and one from ma, that is the Gândhâra Grâma. In this arrangement dha also takes a sruti from pa; and ni takes one from dha and one from sâ.

*Verse* 5.—Nârada called this arrangement the Gândhâra Grâma. This Grâma is practised by celestial musicians.

NOTE.—The *Gândhâra Grâma* has always presented difficulties to the student, and has always proved an attractive problem in spite of the fact that it was obsolete in Sârangdev's time. "Ga takes one sruti from ri" means that ri is lowered from ri ♮ to ri ♭. At the same time ga takes one from ma, and so rises from ga 𝄪 to ga ♭. Dha takes one from pa, making pa "chyut." Behaving like ga, ni sends dha down to dha ♭ and itself rises to ni ♭.

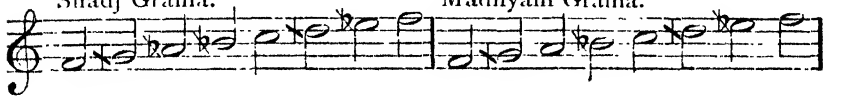


The difficulty of the problem attaches to the chyut pa, which divides the six-sruti interval between ma and dha into two intervals of three srutis.

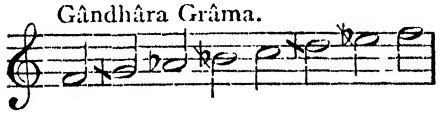
Now, two minor-tones $\frac{10}{9} \times \frac{10}{9}$ are greater than a minor-third ($\frac{6}{5}$ or six srutis). Here, then, is another practical example of the inequality of the srutis. If pa is taken to be a minor-tone or three srutis below dha ♭, the interval separating it from ma ♮ will be $\frac{27}{25}$, a difficult interval to sing. This may account for the disappearance of the Gândhâra Grâma. The differences in harmonic structure between the three Grâmas will be apparent from the following :—

First Murchhana at pitch sâ.

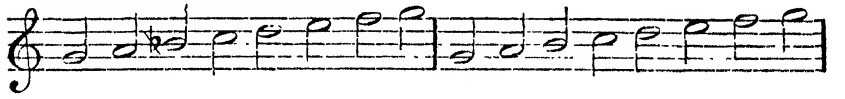
Shadj Grâma. Madhyam Grâma.

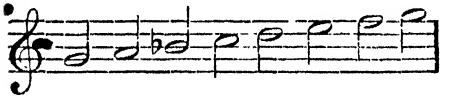


Gândhâra Grâma.

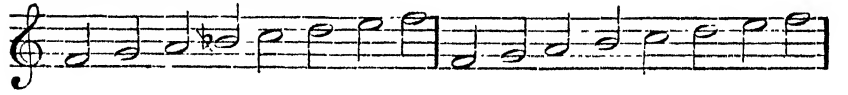


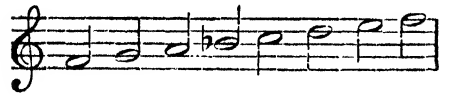
First Murchhana at pitch ri.



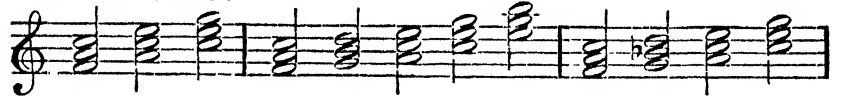


Second Murchhana at pitch sâ.





Common Chords.



The only possible alternative solution is to regard chyut pa as the eleventh upper partial of ri ♭. This would give a beautiful scale with the intervals : ga to ma $\frac{10}{9}$ ; ma to pa $\frac{11}{10}$ ; pa to dha $\frac{12}{11}$ ; dha to ni $\frac{9}{8}$ ; ni to sâ $\frac{10}{9}$ ; sâ to ri $\frac{16}{15}$ ; ri to ga $\frac{9}{8}$.

*Verse* 6.—The chief Grâma is the Shadj Grâma for two reasons : (1) It is the first of the series. (2) It has more Samvâdis. The Madhyam Grâma is also important because that svara is never omitted.

NOTE.—The reasoning of this verse is not very convincing. The last sentence refers to "Shuddh Tâns" (see below).

*Verse* 9.—A Murchhana consists of the ascent and descent of the seven svaras in their natural order. Each Grâma has seven Murchhanas.

*Verses* 10 to 12 name the Murchhanas. The names are those given by Bharata (p. 51).

*Verse* 13.—The first Murchhana of the Shadj Grâma starts from sâ of the middle register. The others start respectively from ni, dha, pa, ma, ga, ri in the lower octave. The first of the Madhyam Grâma starts from ma of the middle octave. The remaining six begin from ga, ri, sâ, ni, dha, pa (the last three of the lower octave).

*Verse* 14.—*Some say that the last six Murchhanas of the Shadj Grâma are got by putting each of the notes ni, dha, pa, ma, ga, ri respectively on sâ.*

*Verse* 15.—*The same principle may be adopted in the Madhyam Grâma. That is to say, in place of the original first Murchhana, ma, pa, dha, ni, sâ, ri, ga, ma, is to be read ga, ma, pa, dha, ni, sâ, ri, ga, and so on.*

NOTE.—This is the method now universally accepted, with this variation, that Râgas of both Grâmas commence their scales from sâ. It is, however, not the method treated of in Ratnâkar. The reader should remember that these discussions refer more particularly to Jâtis than to Murchhanas. (See p. 52.)

*Verse* 17.—Murchhanas are divided into four classes:—

(1) Those which take the shuddh svaras.

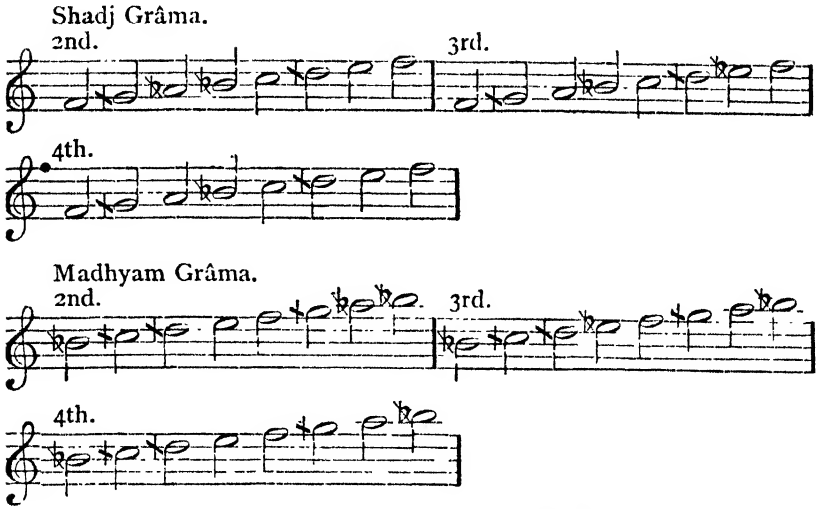
(2) Those which take kâkali ni and the rest shuddh.

(3) Those which take antara ga and the rest shuddh.

(4) Those which take antara ga, kâkali ni, and the rest shuddh.

In this way will be obtained 14 × 4, or 56 Murchhanas in all.

NOTE.—This classification has the fault of overlapping. To show that this is so, the scales are here given:—




The third variety of the Shadj Grâma is the Madhyam Grâma pure and simple, transposed a fourth below. The fourth variety is the third of the Madhyam Grâma transposed a fourth below.

• The writer suspects that verse 17 is probably merely inserted in order to lead up to one of those arithmetical calculations which Sârangdev so delights in.

## The Chapter on Shuddh Tâns (Prakaran 5).

*Verse* 27.—When Shuddh Murchhanas are made Shâdava or Odava they become Shuddh Tâns.

NOTE.—Sârangdev distinguishes such Tâns from Kut-Tâns. The latter are simply permutations of a given number of svaras, such as sâ ri ga, sâ ga ri, ri ga sâ, etc.

The rest of the chapter is taken up with a calculation of the number of possible combinations of six and five svaras in the two Grâmas.

## The Chapter on Sâdhâran (Prakaran 6).

NOTE.—Bharata, after counting up the Tâns, tackled this subject also. In verse 36, he says: "It is chilly in the shade, but in the sun one perspires; spring is coming, but winter has not yet departed." This is the Sâdhâran of the seasons. "In music there are two Sâdhârans—Svara-sâdhâran and Jâti-sâdhâran. In Svara-sâdhâran, ni is raised two srutis; it is called kâkali, but is not shadj. The word Sâdhâran is appropriate, as it stands between ni and sâ. Gândhâra also becomes Sâdhâran, and is called antara ga, and not ma. It stands midway between ga and ma."

After defining Jâti-sâdhâran, the author returns to the subject and proceeds—"Svara-sâdhâran is assigned to the two Grâmas. There is Shadj-sâdhâran (kâkali ni) in the Shadj Grâma, and Madhyam-sâdhâran (antara ga) in the Madhyam Grâma."

*Ratnakar: Verse* 1.—Sâdhâran is of two kinds: Svara-sâdhâran and Jâti-sâdhâran. Svara-sâdhâran is of four kinds: Kâkali-sâdhâran, Antara-sâdhâran, Shadj-sâdhâran, Madhyam-sâdhâran.

*Verse* 2.—Kâkali is the Sâdhâran of sâ and ni. It is common to both; hence the name Sâdharan.

*Verse* 3.—Similarly, antara is the Sâdhâran of ga and ma. The singer should sing sâ, and then take kâkali and dhaivat in order.

*Verse* 4.—Likewise, after singing ma, he should take antara and rishabh, or he may take sâ and kâkali and then return to sâ.

*Verse* 5.—After that, if any of the other svaras is to be omitted, the singer should, omitting it, go to the next. Let the same thing be understood with the antara.

*Verse* 6.—Antara and kâkali are always sparsely used.

NOTE.—These notes were therefore auxiliary or passing notes; they had originally no connection with the chromatic scales. This circumstance is of the highest importance in examining the Grâma-râgas and Jâtis.

*Verse* 7.—When ni takes the first sruti of sâ and ri takes its last sruti, Shadj-sâdhâran occurs.

*Verse* 8.—In the same way, in the Madhyam Grâma, when ga takes the first sruti of ma and pa takes the last sruti of ma, Madhyam-sâdhâran occurs.

NOTE.—This process is discussed at p. 55. "In the Madhyam Grama" is merely a way of expressing the fact that pa is chyut. Dividing Grâma-sâdhâran into two parts appears to be merely pedantic.

*Verse* 9.—These two Sâdhârans are also called Kaishik (of a hair's breadth) because of their tenuity. They are also called Grâma-sâdhâran.

*Verse* 10.—Jâti-sâdhâran occurs when two Jâtis of the same Grâma have an ansha-svara in common. Examples are to be found in the Râgas themselves.

## THE CHAPTER ON JÂTIS (PRAKARAN 7).

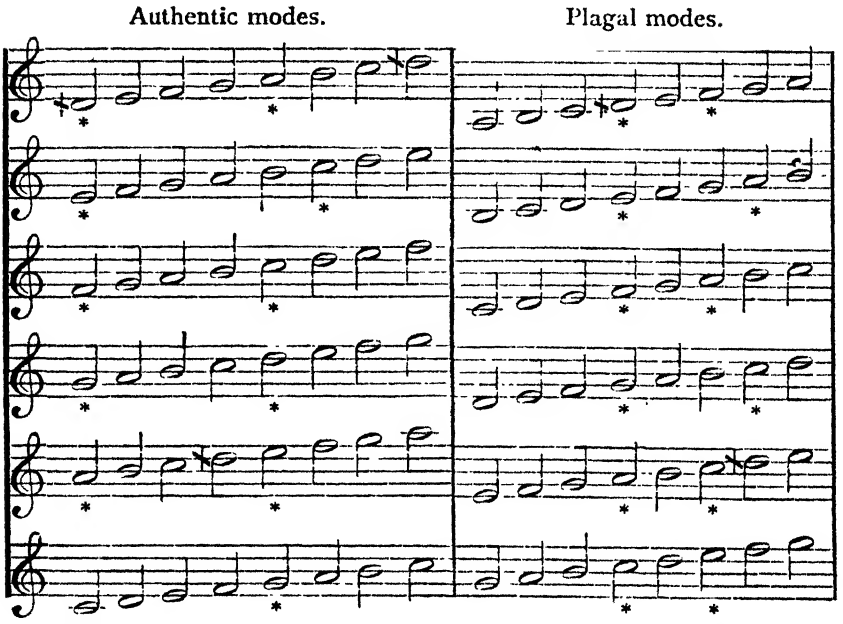
*Verse* 1.—Shuddh Jâtis are seven in number; their names, taken from those of the seven principal svaras, are: Shâdji, Arshabhi, Gândhâri, Madhyama, Panchami, Dhaivati, Naishâdi.

*Verse* 2.—A shuddh Jâti must satisfy the following five tests: The Nyâs Svara (the final) must be the Nâma-Svara (that note from which the Jâti takes its name). So also must the Graha-Svara (the initial note; also, in all probability, either the upper or lower note of the chord forming the pedal accompaniment or drone); so also the Apanyâs (final of a middle cadence, may be rendered "medial"), and the Ansha Svara (the chief or prevailing note; according to Bharata, the same as the Vâdi). The Jâti must be Sampurna (complete with seven notes), and the final must never come in the Târ (higher) octave.

*Verse* 3.—When a Jâti takes a note other than the Nâma-Svara as medial, initial, or ansha it becomes a vikrit Jâti. But even in this case the last rule as to the final must be strictly observed.

NOTE.—According to Bharata, the Ansha Svara is the same as the Vâdi. Judging by modern practice and from the Sârigama examples given by Sârangdev, one can be certain that the Nyâs or final is not invariably part of the drone. The Graha Svara is more likely to be one of the drone notes, but it is a curious fact that theory paid no great attention to the relation of the drone to the scale.

It will not be out of place at this stage to describe in brief the Church Modes of Europe. Each was a Sampurna scale. It was determined by three factors—the lowest note (in India, the note which gives its name to the Murchhana), the final (the Nyâs), and the dominant (that note round which the melody centred). Modes were either Authentic or Plagal. In the former, the lowest note and the final were the same; in the latter, the final was a fourth above the lowest note. The dominant of an Authentic mode was, with certain necessary exceptions, the fifth of the scale; the dominant of a Plagal mode was a third or fourth above the final. Generally speaking, final and dominant corresponded to Vâdi and Samvâdi; as they were not invariably a fourth or fifth apart, but sometimes a third or sixth, the modes gave more harmonic variety than the Shuddh Jâtis. These modes are still employed for special effects. They are as follows:—




*Verses* 4, 5, 7 are taken up with a calculation of the number of permutations and combinations of vikrit Jâtis. This is a kind of exercise in which musical pandits seem to revel. The total arrived at is 153.

In *verse* 6 it is laid down that no Jâti of less than five notes is allowed. Thus there are three kinds in respect of the number of svaras—Sampurna, Shâdava, and Odava.

*Verse* 8 states that there are only eleven vikrit Jâtis in use. *Verses* 9 to 20 give their names and other particulars (see below).

*Verse* 21.—Sages such as Bharata advise the use of Svara-sâdhâran (*i.e.* the use of antara ga or kâkali ni) in the case of Jâtis Madhyama, Panchami, and Shadj-ma-dhyama.

*Verse* 22.—More especially so when the Vâdi notes are sâ, ma, and pa. Others such as Kambal and Asvatar recommend the use of the antara and kâkali in Jâtis where ga and ni are weak. According to them this rule is to be observed not only in Jâtis, but in Râgas of all kinds.

*Verse* 23.—When in the Shadj-madhyama Jâti ni and ga are Vâdi, there will be no Svara-sâdhâran. Moreover, it takes place in vikrit and not in shuddh Jâtis.

NOTE.—The above rules are intelligible and of considerable importance.

* Final and dominant are shown by asterisks. The accidentals, introduced by the writer, show that here also there are two Grâmas. This fact is not as widely recognised as it should be.

*Verses 24 to 27* detail the number of Vâdi or Ansha notes in the 7 shuddh and 11 vikrit Jâtis. Sârangdev's observations on the subject of Vâdi and Samvâdi appear to be somewhat deficient in discrimination. One may hazard a conjecture that as a Jâti may take more than one pair of Vâdi and Samvâdi, its tonality may change during a composition, or its derivative Râgas may be distinguished one from another by the Vâdi and Samvâdi.

*Verses* 28, 29.—There are 13 criteria by which to determine a Jâti: (1) Graha, (2) Vâdi, (3) Nyâs, (4) Târ (*i.e.* the higher compass, or top note), (5) Mandra (the lowest note, the one which gives its name to the Murchhana of the Jâti), (6) Apanyâs, (7), (8) Sannyâs, Vinyâs (two varieties of medial, the latter occurring at the end of the first line, and the former at the end of the first division of the song), (9) Bahulatva (strength or frequency of a note), (10) Alpatva (weakness or infrequency), (11) Shâdavatva (having six notes), (12) Odavatva (having five notes), (13) Antarmârg (the relations of the Vâdi with the other notes).

Sârangdev proceeds to describe in detail (1) the Shuddh Jâtis, (2) the Vikrit Jâtis, (3) the Grâma-râgas, which are generic Râgas themselves derived from the Jâtis.

So far two clear indications have been met with of the practice of varying the pitch of the different scales, the first in the commentary on v. 35 of Ch. 28 of Bharata's Nâtya Shâstra, and the second in Sârangdev's description of Grâma-Sâdhâran. The first reduces the Nâma-svara of Panchami to ri ♭, and the second that of Shâdji to the same note. It is not unreasonable to assume that in the dhaivat system of tuning, the drone consisted of ri ♭ above dha ♭ (the latter being clearly, from Captain Day's account, the bass note), and that the Nâma-Svara of all the Shuddh Jâtis was tuned down to either ri ♭ or dha ♭, so as to avoid a readjustment of the chanterelle strings every time the Jâti was changed. The keyboard string or speaking-string was in its normal state tuned to ri ♭, and the frets arranged accordingly. A readjustment of the frets (Grâma-Sâdhâran) was necessary in order that Shâdji should be played from the pitch of ri ♭. Arshabhi required no change of frets or tuning. Gândhâri could be obtained by the simple device of tuning the keyboard wire down by two srutis,

leaving the frets unchanged. The intervals would be those of the Jâti, but ga would be at the pitch (ri ♯) required for the drone.[1] In the case of Madhyama there are two alternatives. The ga ♮ string may have been brought into requisition for the drone, giving ga ♮ above dha ♯. In this case tuning down the keyboard wire by a semitone would bring Madhyama to the required pitch. The second alternative would be to play Madhyama without change over a ri ♯ drone; this was possible, as ri ♯, dha ♯ and ma ♮ harmonize together. Panchami required the use of antara ga, as explained in the notes below Bharata. Dhaivati, like Arshabhi, required no change; Naishâdi, on a keyboard wire flattened by a semitone, would take the dha ♯ drone. It is possible that Dhaivati and Naishâdi were played from the ri ♯ and ga ♮ frets respectively (the latter with a flattened wire), and brought into line with the other Jâtis as regards pitch. The only difficulty in the way of this supposition is that it would require a lowering of the dha fret in order to give the intervals of the two Jâtis. This flattening of dha is mentioned by Bharata, but not by Sârangdev. One would expect to find a reference to it in the Ratnâkar if the method were in vogue. On the whole there is more reason to conclude that Naishâdi and Dhaivati took the pitch of dha ♯. Although, curiously enough, Sârangdev does not enter into the question of the manner in which the drone strings were adjusted to the Jâtis, or the Jâtis to the drone, there can be no doubt that the method employed was something like the one outlined here. That the Jâtis were adjusted to the drone, and not the reverse, is proved by the existence of Grâma-Sâdhâran; no other explanation is conceivable. The manner of adjustment must have been something like that now suggested, first because it is in conformity with the text of Ratnâkar and requires no new "vikrit svaras," and secondly because similar devices are in use at the present day.

## The Jâtis.

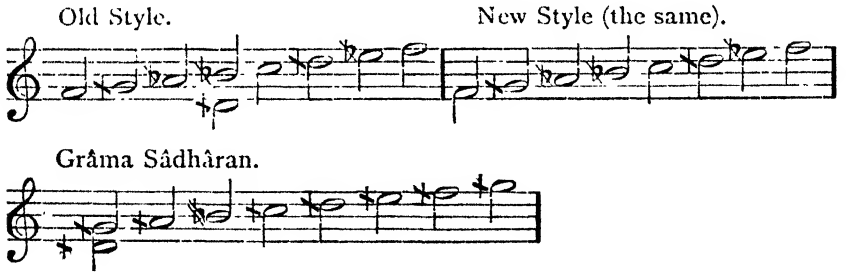
Material particulars only are here transcribed. Those omitted have reference to the rhythm or the time and mode

[1] This kind of practice survives to the present day (see p. 29).

of performance. In small print will be found a short discussion of derivative Grâma-râgas or Râgas. Then will follow in each case three scales, the first representing the scale of the Jâti with shuddh notes (the Murchhana being indicated by a separate note), the second representing the scale with the new tuning mentioned in Prakaran 4, verses 14 and 15, the drone of Shadj tuning being indicated by double stems to the notes, the third showing what notes were actually produced by the various devices employed under the old tuning to adjust the Jâtis to the drone of dha ♭ or dha ♭ combined with ri ♭ (or perhaps, in the case of Madhyama, dha ♭ and ga).

SHADJI.—Vâdi may be sâ, ga, ma, pa, dha. Nyâs sâ; Apanyâs ga and pa; Murchhana dha of Shadj Grâma; ga frequent. When Sampurna, some make ni kâkali. When Shâdava, omit ni. Sâ, ga and sâ, dha often occur in pairs. When ga is Vâdi, ni will not be omitted. Example: Varâti-Râga.

• NOTE.—Râga-vibodh, Svaramela Kalanidhi, Sangit Sarâmrit, all give varieties of the Hindustâni Todi scale for Varâti or Varâli. The modern Varâdi of Hindustân is sung to the Purvi scale. The present writer cannot explain this discrepancy; he can only point out that Southern music has always, so far as is known, been steeped in chromatic influences, from which Bharata and Ratnâkar were comparatively free. The modern Varâdi may have come to Hindustân from the South.
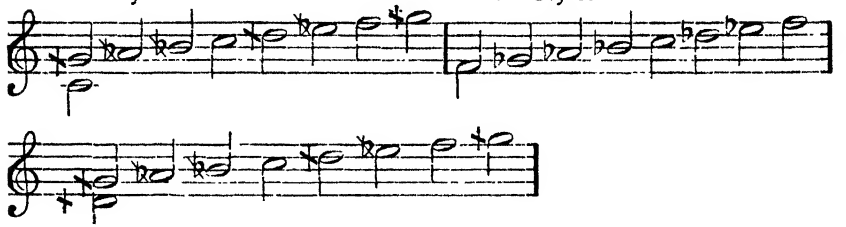



NOTE.—None of the Grâma-râgas are derived direct from this Jâti.

ARSHABHI.—Vâdi may be ni, ri, dha. Nyâs ri; Apanyâs, the Vâdis; Murchhana pa, of the Shadj Grâma. Pa infrequent; Shâdava omits sâ; Odava omits sâ, pa. Ga and ni will be in close relation with the other svaras (this

simply means that they will be frequent). Examples: Deshi, Madhukari.

NOTE.—Râga-vibodh puts Deshi in our Purvi scale. Svaramela Kalanidhi does the same with Ardra-Deshi. Sarâmrit puts Shuddh-Deshi in the Kâfi scale, and Ardra-Deshi in the Bhairava scale. In Hindustân, Deshi is sung either in the Kâfi or Âsâvari scale. Madhukari is an uncommon Râga; it is mentioned by one Telugu writer.

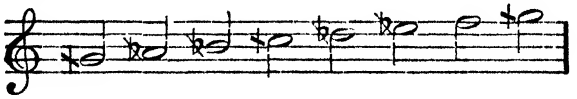
Old Style. New Style.



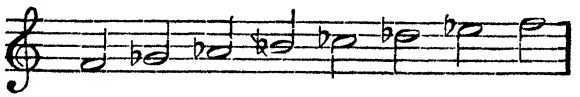
NOTE.—Taking Prakaran IV., verses 14 and 15 literally, the scale of the "Madhya Saptak" would be an octave lower.

*Grâma-Râgas.*—The Grâma-râga Pancham-shâdava (No. 22 of Sârangdev's list) is derived from Dhaivati and Arshabhi. It appears to consist of the shuddh notes with a ri drone. Derived from it is the Râga Gujri which Râga-vibodh, Chaturdandi, Svaramela, Sarâmrit put in our Bhairava scale. The modern Hindustâni Gujri is in Todi. Sârangdev says that Pancham-shâdava takes ni kakali. That may only be as a passing note. From the example given, it is probable that ni is shuddh. The example would be inharmonious if sung in Bhairava, as the progression ma ni and ni ma is frequent and prominent. Moreover, pa and sâ are omitted in the example given.

Grâma-râga Revagupta (No. 26) is also derived from this Jâti (combined with Madhyama). Deshi (discussed above) is the descendant of Revagupta. The scale which best suits the example given is the Madhyam Grâma with dha komal (it will be remembered that Bharata mentions this variety), and ri as drone. In fact, no other scale appears to fit in with this example. It is curious that if one starts Arshabhi from the Murchhana pa, one arrives at this very scale. Starting from the drone, the scale is as follows :—



or, new style (putting pa ♭ instead of the current but irrational ma ♯)—



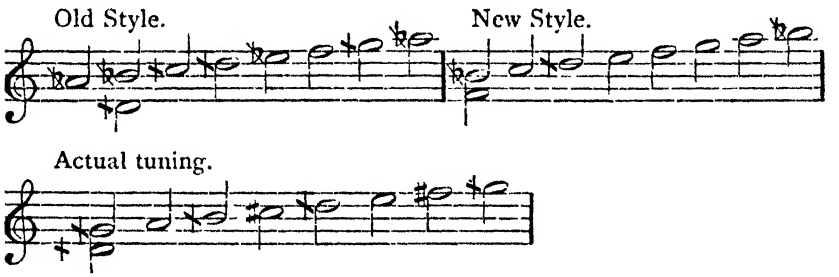
A Râga resembling Bhairava may quite well have originated in this Grâma-Râga.

GANDHARI.—Any note but ri or dha may be Vâdi; Nyâs ga; Apanyâs sâ and pa; Murchhana dha of the Madhyam Grâma. When Shâdava omit ri, when Odava, ri and dha. When pa is Vâdi, it is not Shâdava; and when ni, sâ, ma, pa are Vâdi, it will not be Odava. The Nyâs will pair with one of the five Vâdis. When Sampurna, ri and dha will come together. Examples: Gândhârapancham, Deshi, Velâvali.

NOTE.—Madhyam-Grâma, No. 17 of the Grâma-râgas, is compounded of this Jâti with Madhyama and Panchami. It takes the kâkali ni. (That must mean occasionally.) Madhyamadi is derived from it. That Râga is even now sung in the Kâfi scale, and all the pandits agree in putting Madhyam-Grâma under Kâfi. The shuddh scale of Ratnâkar also suits the example given. Thus there can hardly be any doubt that the notes of this Grâma-râga are the shuddh svaras of the Madhyam Grâma.

From Gândhâra-pancham is derived Deshâkhya, which the Southern pandits treat as chromatic. This Grâma-râga begins with sâ, "takes the kakali," and the scales of Yaman or Bihâg suit it admirably.

Velâvali: Chaturdandiprakâsha, Sarâmrit, Svaramela put this Râga under Kâfi, and Râga-vibodh under our Bilâval (the common major scale).




The second scale transposed to Sâ would be Yaman; taken as a Murchhana from sâ, it would be Bilâval. The third is arrived at by tuning the speaking string one semitone lower, so that the ga fret gives ri. The 3rd, 4th, and 7th notes are respectively srutis 14, 18, 5 of those in the list on p. 77.
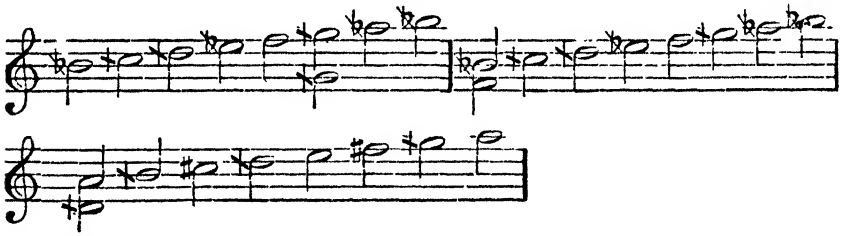
MADHYAMA.—Vâdi may be any note except ga and ni. Nyâs ma; the Vâdis will be Apanyâs; Murchhana ri of Madhyam-Grâma; sâ and ma frequent; ga less frequent. When Shâdava, ma is omitted; when Odava, ni and ga. Examples: Shuddh-shâdava, Deshi and Andholi.

NOTE.—Grâma-râgas 17 (Madhyama-grâma, mentioned under Jâti Gândhâri), 19 (Shuddh-shâdava), 21 (Bhinn-pancham), 26 (Revagupta

discussed under Arshabhi), 28 (Kukubh), are derived from this Jâti. No. 19 is said to be a "vikrit" form of Madhyama. Ma is Vâdi, Nyâs, Graha, Murchhana. It takes antara and kâkali. From it are supposed to have originated Todi and Bangal. The former is our Bahiravi; the Southern pandits mention a Shuddh-Bangal with the Kâfi scale, Chaturdandi and Sarâmrit notice a Karnât-Bangal in the Bhairava scale, while Râga-vibôdh and Svaramela assign Bhairava scale to Bangal, and a chromatic scale called Karnât to Shuddh-Bangal. From the example given, there is no reason whatever to assume the scale to be other than that described in unmistakable terms by Sarangdev. It is Bilâval starting from madhyam with the low sixth (*i.e.* in this case, ri ♭). Bhinn-pancham is the parent of Varâti, which is discussed under Shâdji. The Sârigama given is clearly in the shuddh Madhyam Grâma scale, and the drone must be Madhyam.

In Kukubh, dha is Vâdi and everything else, except Nyâs, which position is assigned to pa. Descended from it is Asâvari, which Râga-vibodh puts in our Bhairava scale. Bahiravi with a shadj drone suits best the Sârigama given. As the Grâma-râga is partly produced from Dhaivati, it may have taken the form of Bahiravi.

Deshi has been described (under Arshabhi). Ândholi is Khamâj (Sarâmrit), or Kâfi (Chaturdandi and Svaramela).
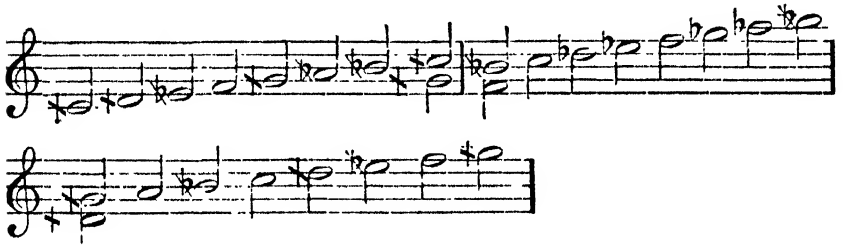


The Jâti may also have been performed with the shuddh notes over the dha ♭ and ri ♭ drone. It takes chyut pa even with the new tuning. The time when chyut pa was abandoned must coincide with the time when the practice of beginning Madhyam Grâma scales from ma instead of sâ fell into disuse.

PANCHAMI.—Vâdis ri and pa; Nyâs pa; Apanyâs ri, pa, ni; Murchhana ri of Madhyam Grâma; sâ, ga, má infrequent. When it is Sampurna, the leap from ga to ni is used. When Shâdava, omit ga; when Odava, ga, ni. When ri is Vâdi, the Odava form is not used. Ri and ma will come together. Examples: Shuddh-pancham, Deshi, Ândholi.

NOTE.—Grâma-râgas 17, 21, 28 described above, are partly derived from Panchami. Shuddh-pancham is No. 30. It is said to be composed in part of Madhyama and in part of Panchami. Pa is Vâdi, Graha and Nyâs, and also the Murchhana. Shuddh-pancham is the progenitor of

Dakshinâtya, Ândholi, Malhâri, and Malhâr; also of Karnât-Gaud, Deshvâl-Gaud, Turushk-Gaud, Dravid-Gaud. Sârangdev, in his chapter on Instrumentation, states that Deshvâl-Gaud is also called Kedâr-Gaud, and Turushk-Gaud Mâlava-Gaud. Svaramala gives for the former a Bilâval scale without ga and with two madhyams. Chaturdandi and Sangîtâmrit introduce a komal nishâd. The latter (Mâlava-Gaud) is by common consent the Hindustani Bhairava. The Sârigama given for No. 30 appears to be in Shadj tuning, and the scale to be like that of Deshkâr, but Sampurna (complete with seven notes). Deshi and Ândholi have been discussed.
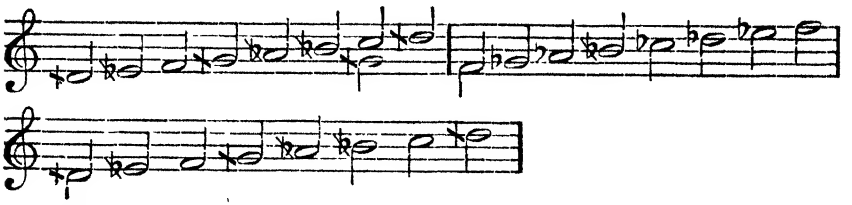


The third of these scales is the Deshvâl Gaud or Kedâr Gaud of Chaturdandi. With ni kâkali, it is Shuddh-pancham. These are interesting circumstances, as they support the writer's arguments.

DHAIVATI.—Vâdi ri, dha; Nyâs dha; Apanyâs ri, ma, dha; Murchhana ri of Shadj Grâma; in ascending the scale, sâ and pa are omitted; when Shâdava, pa is dropped; when Odava, sâ and pa. Examples: Shuddh-Kaishik, Deshi.

NOTE.—22 and 28 described respectively under Arshabhi and Madhyama are partly derived from this Jâti. So is 24, Takka by name. Takka is described as follows: Sâ is Vâdi, Graha, Nyâs and Murchhana; takes antara and kâkali; pa infrequent. It is the parent scale of Gaud or Gaul and Kolâhal. All the pandits agree in putting Gaud under the Hindustâni Bhairava (their Mâlava-Gaud) scale. The Sârigama given is in shadj tuning; ri is omitted; it would be most uninteresting and could not by any stretch of the imagination be referred as it is to Dhaivati unless dha is taken to be komal. If that svara is komal, the scale becomes that of Bhairava.

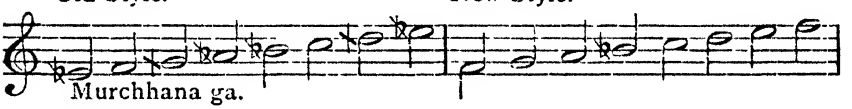
Shuddh-Kaishik above appears to be an error for Takka-Kaishik, No. 31. The latter is produced from the Dhaivati and Madhyama Jâtis; Murchhana, Vâdi, Graha, Nyâs all dhaivat; takes antara and kâkali. The example given is probably in dhaivat tuning, and is therefore as described. Transposed to shadj it would be the Hindustâni Âsâvari.



NAISHADI.—Vâdi ni, ri, ga; Nyâs ni; Apanyâs the Vâdis; Murchhana ga of the Shadj Grâma; ni, ri, ga frequent; when Shâdava, omits pa; when Odava, pa and sa. Examples: Shuddh-Sâdhârit, Deshi, Velâvali.

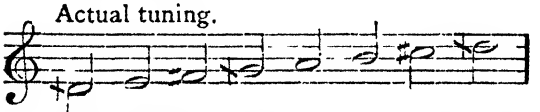
NOTE.—Shuddh-Sâdhârit is described as follows: Sâ is Vâdi, Graha and Murchhana; ma is Nyâs; ni and ga are infrequent. It appears to have the shuddh svaras of the Kâfi scale, with shadj as drone.

Old Style. New Style.



Murchhana ga.

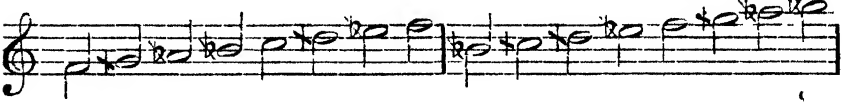
Actual tuning.



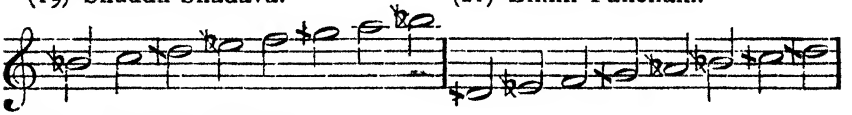
The speaking string is tuned down one semitone, so that the ni fret gives dha. The 6th note is Sruti 15 of the list on p. 77.

For convenience of reference the suggested scales of the Grâma-râgas mentioned in the above discussion are here given—

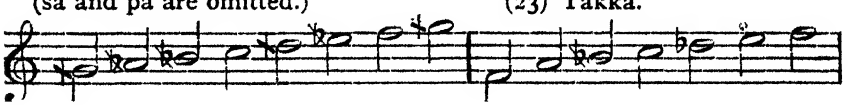
(1) Shuddh-Sâdhârit. (17) Madhyam-Grâma.



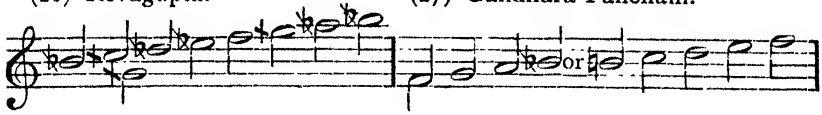
(19) Shuddh-Shâdava. (21) Bhinn-Pancham.



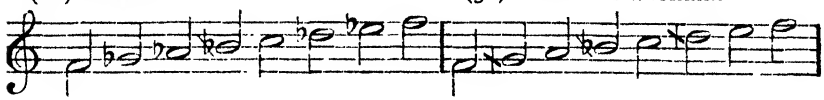
(22) Pancham-Shâdava.
(sá and pa are omitted.) (23) Takka.



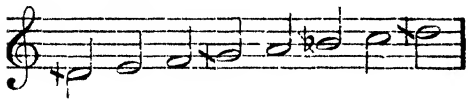
(26) Revagupta. (27) Gândhâra-Pancham.




(28) Kukubh. (30) Shuddh-Pancham.



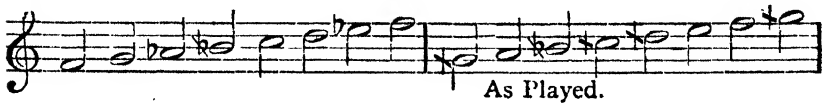
(31) Takka-Kaishik.



There are eleven composite Jâtis made up as follows (Ratnâkar on Jâtis, verses 9 to 16):—

| Serial No. | Name. | Component Jâtis. |
|---|---|---|
| 8 | Shadj-Kaishiki | Shâdji, Gândhâri |
| 10 | Shadj-Madhyama | Shâdji, Madhyama |
| 16 | Gândhâra-Panchami | Gândhâri, Panchami |
| 17 | Andhri | Gândhâri, Arshabhi |
| 9 | Shadjodichyava | Shâdji, Gândhâri, Dhaivati |
| 15 | Kâmarivi | Naishâdi, Panchami, Arshabhi |
| 18 | Nandayanti | Gândhâri, Panchami, Arshabhi |
| 11 | Gândhârodichyava | Gândhâri, Dhaivati, Shadji, Madhyama |
| 14 | Madhyamodicnyava | Gândhâri, Dhaivati, Panchami, Madhyama |
| 12 | Rakta-Gândhâri | Gândhâri, Naishâdi, Panchami, Madhyama |
| 13 | Kaishiki | Shâdji, Gândhâri, Panchami, Madhyama, Naishâdi |

Nos. 8 and 13 of the list are both called Kaishiki, and both have Shadj and Gândhâri in their composition. The writer, from the examples given, is of opinion that the scale used was the following :—



As Played.

It is an interesting fact that the scale which suggests itself in the case of Takka-kaishik (Grâma-râga 31) has similar intervals. Kaishiki means "of a hair's breadth," and seems to have been applied to a scale differing from the shuddh scales by a hair's breadth. Here ri, ga, dha, and ni are all one sruti

only higher than those notes in Shâdji. Shadjodichyava appears to be in the Bilâval scale ; the others are very likely in the shuddh Grâmas. The commentator, Kallinâth by name, puts all the Jâtis in the shuddh Grâmas; there is nothing, however, to show that he applied his mind to the difficulties of the subject.

The thirty Grâma-râgas of Ratnâkar appear to be generic Râgas, from which the songs and Râgas in use were derived. No object would be gained at this stage in hazarding conjectures as to the constitution of those which have not already been discussed.

## Recapitulation.

The orthodox system of tuning in ancient times was in dhaivat madhya. This was the original dhaivat. It is that dhaivat which is in tune with shadj, that is, at an interval of six srutis from it. Shadj was so-called (*i.e.* born of the sixth) from this circumstance. The drone strings were dha ♭, ri ♮ and ga ; the speaking-string, upon which the air was played, was ri ♭. Just as the standard scales of modern Hindustan may be taken to be Bihâg with the high dhaivat, and Bilâval with the low or madhya dhaivat, so the standard scales of Bharata and Ratnâkar were from ni 𝄫 to ni 𝄫 with pa shuddh (in which antara ga corresponded to the tivra madhyam of scales of the Kalyân type), and from ni 𝄫 to ni 𝄫 with pa chyut. The modern "dha" was represented by pa. This is the secret of the much-vexed question of the Grâmas. The first scale comprised the notes and intervals of the Shadj Grâma, and the second those of the Madhyam Grâma. Just as in the Church Modes of Europe and the Modes of Ancient Greece, new and interesting combinations were obtained by varying the starting-point of the scale, so in India, first the Murchhanas, and then the Jâtis came into existence. It was the existence of the drone in Indian music which led to the evolution of the Jâtis. Once they were evolved, the word Murchhana came to mean nothing more than the lowest note permissible in any Jâti or Râga. The compass of a composition was determined by its Murchhana; its Jâti was determined by the drone and by various factors somewhat akin

to the final and dominant of the Church Modes. There were seven shuddh Jâtis, one for each shuddh note. It was found that the Shadj Grâma was best suited to four of them, and the Madhyam Grâma to the other three. Each required a drone corresponding to its chief note (Nâma-svara). In practice it was found more convenient to vary the pitch of the scale than that of the drone ; various devices were invented for bringing the Nâma-svara to the pitch of one of the drone strings. The reader's attention has already been drawn to the fact that present practice tunes the ma string [1] a semitone higher, so that the ni fret in the Yaman scale gives sâ, in order to play Bahiravi without difficulty. Similarly, Kâfi is got from the Bihâg scale by tuning down a whole tone, and taking ri to be sâ. In Sârangdev's time, the speaking-wire (ri ♮) was tuned down a semitone for Jâtis Gândhâri, Madhyama, Naishâdi ; Panchami was obtained with the aid of antara ga ; Arshabhi and Dhaivati required no special device ; and Shâdji necessitated the use of Grâma-Sâdhâran, for, otherwise, the wire would have had to be tuned either a whole tone higher or a minor-third lower.[2] Tightening a string by a whole tone is quite a different matter from lowering it by that interval. Possibly it was this Grâma-Sâdhâran (in which the sâ, ma and pa frets were shifted down one sruti, and the ga and ni frets shifted up), which led to the general adoption of shadj tuning. It is a curious fact that Minappa, a Madras writer, puts shadj on the sruti reserved for chyut shadj. Among the vikrit or irregular Jâtis, the most interesting is Kaishiki. This appears to have differed from Shâdji in this, that, in the process of Sâdhâran, sâ and ma were achyut (or unchanged), while ga moved up to antara and ni to kâkali. The scale was called Kaishiki because it differed by a hair's breadth from Shâdji. The musicians of the present day in Western India call a scale somewhat like the first (but with komal dha) Âsâvari (some say Jivanpuri) ; Shâdji corresponds to Kâfi. The Jâtis in their turn led to the Grâma-râgas, and the Grâma-râgas to the Râgas in common use. Even in

[1] That is, the string upon which the melody is played.

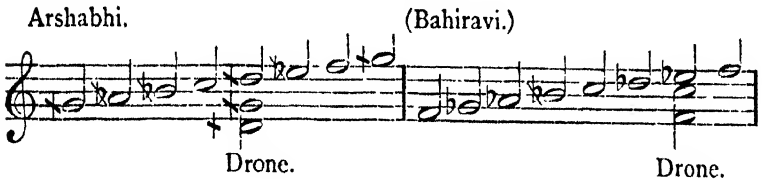
[2] Sârangdev and Bharata are completely silent on the question of the drone. They take it for granted that the reader knows. These statements are therefore inferences ; but none the less valid.

Sârangdev's time, the first two seem to have existed in theory only. Râgas were divided into two classes, mârga and deshi, which may be rendered classical and modern. In all probability, these names had some reference to the two schools of tuning. At the present day (although dhaivat tuning is mentioned by Captain Day) shadj tuning appears to have driven its rival off the field; this may then perhaps be regarded as a victory for the deshi musician. The Sangit Ratnâkar was written in the thirteenth century. From internal evidence one may conclude that the contest between the two systems was then in progress. As regards the Gândhâra Grâma, it may be mentioned that it was admittedly obsolete at the time of Ratnâkar; the description therein given of the scale is intelligible, and shows that it was one difficult of execution but capable of considerable development. One of its Jâtis would be represented nowadays by Bihâg with the note which the present writer calls kaishik ma in place of komal ma; another by Kâfi with sâdhâran ga in place of komal ga.

The consequences of the change of tuning from dhaivat to shadj may be here briefly outlined. Whereas, in the orthodox system, roughly speaking, all compositions were performed in the key of ri ♭, with a drone consisting of dha ♭ (below) and ri ♭ (above), in the modern system the universal key is shadj, and the drone pa or ma, according to circumstances, above sâ. There appears to have been an intermediate stage in which the key for compositions in the Madhyam Grâma was ma ♮, with the drone ma above sâ. The effect while that stage lasted was, as regards the Madhyam Grâma, precisely the same as in dhaivat tuning.[1] With the disappearance of that stage went the note known as chyut pa, and it is a fundamental characteristic of the modern system that sâ and pa are fixed and can never become vikrit or chromatically altered. They correspond in that respect to the ancient ri ♭ and dha ♭, which never really became vikrit as the examples of actual tuning for the various Jâtis and Grâmas given in Appendix E will show. In a word, it may be said that the chief change to be associated with the substitution of tuning in shadj for tuning in dhaivat was that

[1] Except, apparently, compositions in Jâti Madhyama.

sâ and pa took the place of dha ♭ and ri ♭, and the chord of the drone was turned upside down. This must have led to changes of intonation and possibly of tonality. Signs of such changes are not wanting; as an example may be quoted the modern Bahiravi scale with the harmonic fourth which has taken the place of the Jâti Arshabhi.




The lower note of the drone is more powerful and more reinforced in the tambura than the upper note of the drone. It is difficult to sing the high fourth in the scale of Bahiravi. The change of tuning led to a deplorable confusion of nomenclature; this and the organic changes just described may account for the difficulties encountered in any attempt to trace the modern Râgas back to the Grâma-râgas of the Sangit Ratnâkar.

# CHAPTER V

## CONCLUDING OBSERVATIONS

IN this chapter will be included (1) speculations concerning the origin of the Indian scales; (2) some remarks regarding Sârangdev's immediate successors; (3) a suggestion as to the most convenient method of classifying the Indian Râgas; (4) a discussion of the manner in which Indian airs may be performed in correct intonation upon instruments of European fashion.

**Inferences regarding ancient Indian scales to be drawn from the Sanskrit Class-names.**

As a result of the above discussion of the actual orthodox methods of tuning for the performance of the Jâtis, it now becomes possible to reconstruct the list of srutis employed by Sârangdev. It is abundantly proved that he did not clearly distinguish between all of them. Appendix E shows at a glance how Grâma-Sâdhâran, the tuning down of Gândhâri Jati, etc., by two srutis, and the shuddh notes of the three Grâmas and of the scale known as Kaishiki, together furnished twenty-two srutis according to Sârangdev's theory of the equality of the srutis. When one goes further and ascertains from the laws of harmony the exact positions of these srutis, one finds that in three cases, two srutis which are near to one another but not identical are treated as one.

In the following list, the exact position of the ancient srutis is given, together with the Sanskrit individual names and the class-names mentioned in the Sangit Ratnâkar (Prakaran 3, verses 24–38). As remarked in an earlier chapter, the term "sruti" was primarily applied to an interval.

THE SRUTIS OF THE SANGIT RATNÂKAR.

| Serial number. | Individual names. | Class-names. Original svaras. | Class-names. Later additions. | Description. | Comparative vibration numbers, sâ being 240. |
|---|---|---|---|---|---|
| 0 | Kshobhini | madhyâ | | ni (shuddh) | 213 1/3 |
| 1 | Tivra | | diptâ | ni (kaishik) | 216 |
| | | | | ni (part of Grâma-Sâdhâran) [1] | 222 2/9 |
| 2 | Kumudvati | | âyâta | ni (kâkali) | 225 |
| 3 | Manda | | mridu | sâ (chyut sâ) [1] | 237 1/27 |
| 4 | Chhandovati | madhyâ | | sâ (shuddh) | 240 |
| 5 | Dayâvati | karunâ | | sâ (major-third above dha) [1] | 250 |
| 6 | Ranjani | | madhyâ | ri | 256 |
| 7 | Raktikâ | mridu | | ri (shuddh) | 266 2/3 |
| 8 | Raudri | | diptâ | ri | 270 |
| 9 | Krodhâ | | âyâta | ga (shuddh) | 284 4/9 |
| 10 | Vajrikâ | | diptâ | ga (sâdhâran) | 288 |
| | | | | ga (Grâma-Sâdhâran) [1] | 296 8/27 |
| 11 | Prasârini | | âyâta | ga (antara) | 300 |
| 12 | Priti | | mridu | ma (chyut ma) [1] | 316 4/81 |
| 13 | Marjani | madhyâ | | ma (shuddh) | 320 |
| 14 | Kshiti | mridu | | ma (major-third from ri) [1] | 333 1/3 |
| 15 | Rakta | | madhyâ | ma | 337 1/2 |
| 16 | Sandipani | | âyâta | pa (Gândhâra Grâma) [1] | 345 5/9 |
| | | | | pa (Madhyam Grâma) [1] | 355 5/9 |
| 17 | Alâpini | karunâ | | pa (shuddh) | 360 |
| 18 | Madanti | karunâ | | pa (major-third from ga) [1] | 375 |
| 19 | Rohini | | âyâta | dha | 384 |
| 20 | Ramyâ | madhyâ | | dha (shuddh) | 400 |
| 21 | Ugra | | diptâ | dha | 405 |
| 22 | Kshobhini | madhyâ | | ni (shuddh) | 426 2/3 |

[1] These notes are no longer in use.
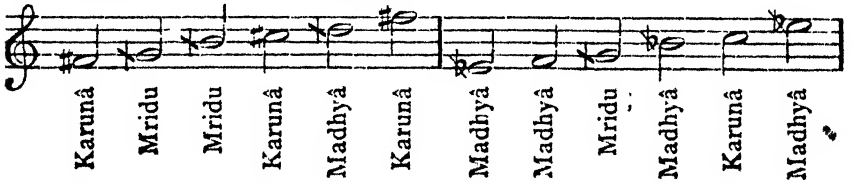
In the columns headed Class-names are collected the names regarding which the remark is made: "It is said that this classification is based upon the effects which the srutis are supposed to produce." They may be translated: "mridu," soft; "madhyâ," intermediate, that is to say, intermediate between soft and pathetic; "karunâ," pathetic; "diptâ," brilliant; "âyâta," stretched. The notes have been divided into original svaras and later additions on the following principles: (1) It is assumed that the term "âyâta" was primarily applied to a note for which no fret was in use, and

which was therefore obtained in the manner familiar to any one acquainted with Indian methods—that is, stretching the wire to one side. The whole of the âyâta class are therefore rejected. (2) The notes of the Gândhâra Grâma, and of the Kaishiki scale, and those used in Grâma-Sâdhâran, are likewise regarded as later accretions to the Hindu musical system. (3) The "madhyâ" notes go in pairs, thus—

| | | |
|---|---|---|
| ni 𝄪<br>dha 𝄫 | ri 𝄭<br>sâ | ma 𝄮<br>ma 𝄪 |

It is possible that shadj tuning (which, although not considered orthodox by Sârangdev, may have been invented centuries before his time), may have introduced the ri 𝄭 and ma 𝄮, and that they may have been named "madhyâ" on the analogy of ni 𝄪. At the present day, the first fret on the open wires sâ and ma gives ri 𝄭 and ma 𝄮, respectively. The intervals $\frac{\text{ri } 𝄭}{\text{sâ}}$ and $\frac{\text{ma } 𝄮}{\text{ma } 𝄪}$ are not the same; the same fret with the help of a slant or a curve is made to do service for both, the sâ and ma wires lying side by side. Of the six notes given in the diagram, it seems reasonable to retain ni 𝄪, dha 𝄫, sâ, and ma 𝄪. The choice is based on the assumption that dhaivat tuning was the original system.

The notes which the above considerations lead one to regard as the earliest foundation of the Hindu musical system fall naturally into two scales:—




The reader will notice that the Class-names, so far as these scales are concerned, may be truly said to denote "the effect which the srutis are supposed to produce." The propriety of the classification would be made still more apparent by the addition of a drone in dha 𝄫. These scales apparently take one back to a very remote period in the history of the Aryan race. The Class-names may even be earlier than the

solfa names, shadj, rishabh, etc.; they are at any rate older than the name Gândhâra. As regards the derivation of the solfa names:—(1) Nishâd is generally connected with the Sanskrit root which means "to sit"; it may be looked upon as a kind of final or tonic. (2) Shadj is "born of the sixth," that is, developed at an interval of six srutis from dhaivat. (3) Madhyam is the "middle" note, as near as may be, in the second of the two scales given; similarly ma ♮ is the middle note of the first scale. (4) Pancham is the "fifth" note of the second scale. (5) The derivation of dhaivat, rishabh, gândhâra is more open to controversy. The first scale is the same as the archaic scale of Olympus, well-known to Greek scholars; the second is one of which traces are to be found in the remains of all known bygone civilizations (see Carl Engel's "Music of the most Ancient Nations"). The first appears to contain the germ of the Karnatic system, which Madras scholars attribute to Nârada, while the second is undoubtedly the forerunner of the Shadj Grâma and the musical system which forms the basis of the treatises of Bharata and Sârangdev.

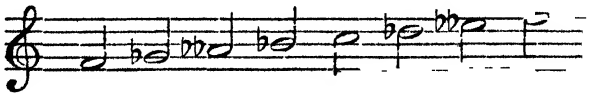
A rival hypothesis.

These conclusions, it may be mentioned parenthetically, run counter to the hypothesis of the development of scales from "clusters of quarter-tones." Regarding them as rival theories, one's judgment between them should be based on evidence rather than authority, because no theorist, however remote the age in which he lived, was privileged to witness the actual evolution of any musical scale. Writers who deal with the subject of modes generally regard them as built up individually from tetrachords, and it is a favourite theory that the earliest tetrachord was evolved from a cluster of quarter-tones or semitones, followed by a leap to the note a fourth above the starting point. In course of time, the theory runs, the cluster became reduced to two notes a semitone apart, leaving a scale of the same form as that of Olympus. The wide intervals between the second and third and fifth and sixth degrees of the scales were then bridged over in various ways, leaving a scale consisting of two similar tetrachords. To the historian of Karnatic music may be left the solution of the question as to what support the theory derives from what is known of the chromatic

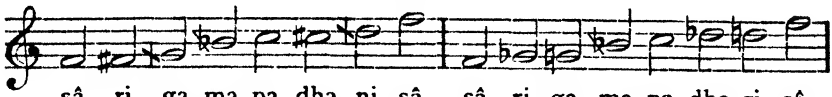
scales of India. As regards the Grâma scales the writer is of opinion that the evidence so far is entirely adverse. The subject, however, can hardly be said to be ripe for discussion until the question of tonality in Indian music has been thoroughly investigated. As stated in an earlier chapter, correct intonation must form the groundwork of such an inquiry, and it is with intonation alone that this volume professes to deal. This much may here be said respecting tonality, that the degree of tonality, which is indispensable to the tempered scales of Europe, is not to be looked for in dialectical scales built up from natural intervals. The tonality of an Indian Râga may be said to be determined by the factors enumerated by Bharata and Sârangdev, to wit, the Vâdi and Samvâdi, the Ansha Svara (prevailing note), the initial, medial and final (Graha Svara, Apanyâs and Nyâs).

**Errors of Sârangdev's successors.**

The consequences of the triumph of shadj tuning over its rival have been discussed. There is no hint in Kalinâth's commentary on the Ratnâkar, published two centuries later, regarding the progress made by shadj tuning. No addition was made to the literature of Hindustâni music until Pârijât's time (the seventeenth century). Meanwhile, two treatises had appeared in the South, the Svaramela Kalânidhi of Râma Amâtya, of about 1550, and the Râga Vibodh of Somnâth, of 1609. These two writers made collections of the Râgas of Southern India. Their tuning was in shadj. They knew of the Ratnâkar, and looked upon it as a work of great authority, but they appear to have been entirely ignorant of the fact that it was based upon a different system of tuning from their own. They accepted Sârangdev's theories, and assumed without hesitation that his shuddh notes were the same as their own. What their own were is clear, first from the Râga Mukhâri, which takes the shuddh notes, and secondly from modern treatises, such as that of Mr. A. M. C. Mudliar. In tempered notation he represents the "shuddh" scale as follows:—



He states that the double-flat notes are "as near as possible" D and A natural. The scale may possibly be either of the following; it needs verifying:—



sâ ri ga ma pa dha ni sâ. sâ ri ga ma pa dha ri sâ.

How this collection of notes came to be regarded as "shuddh" is an interesting problem. Counting up the srutis from "ni," the author of Râga Vibodh said his sâ was on the fourth, the ri on the seventh, the ga on the ninth, and so on, copying from Ratnâkar, and never imagining that they had another scale in Hindustân. It is obvious that a deplorable confusion of names was bound to ensue, especially when, in due course, an incursion was made into the region of "vikrits." Râma Amâtya, copying the chyut svaras of Grâma Sâdhâran, spoke of "chyut madhyam ga," "chyut pancham ma," and "chyut shadj ni." Somnâth contracted these names to mridu ma, mridu pa, mridu sâ. The actual notes called by these names appear to have been the antara ga of Ratnâkar (ga ♮), ma tivra, and the kâkali ni (ni ♮). Somnâth describes the two following scales, regarding the identity of which there is no doubt whatever, in these terms:—

1. Râga Todi (the Hindustâni Bahiravi).

| Somnâth's notes. | ri shuddh. | ga sâdhâran. | ma, pa shuddh. | dha shuddh. | ni kaishik. |
|---|---|---|---|---|---|
| Actual notes with accidentals | ri ♭ | ga ♭ | ma ♮, pa | dha ♭ | ni ♭ |

2. Sri Râga (the Hindustâni Kâfi).

| Somnâth's notes. | ri tivra. | ga sâdhâran. | ma, pa shuddh. | dha tivra. | ni kaishik. |
|---|---|---|---|---|---|
| Actual notes with accidentals | ri ♯ | ga ♮ | ma ♮, pa | dha ♯ | ni ♮ |

No further proof of the disorder introduced into Indian

musical terminology by these authors need be adduced. This state of affairs has unhappily prevailed up to the present day. When Pârijât was written, shadj tuning prevailed. The author showed more perspicacity than the Karnatic writers, appropriating the shuddh notes of the Ratnâkar to the Kâfi scale, and designating the Madras "shuddh" notes "purva," but no scientific terminology could be expected of any writer who adhered to Sârangdev's system. Nowadays, among the practical musicians of Western India, the Sangit Ratnâkar is looked upon as belonging to a bygone age although no one is able to say what it is which makes its theories inapplicable to modern practice. Professional musicians have constructed their own systems; needless to say, they differ widely one from another.

**The utility of the Indian harmonium.**

A considerable amount of space in the earlier chapters of this book has been devoted to the Indian harmonium. The reader may be inclined to ask what useful purpose such an instrument is likely to serve. The tempered harmonium is at present enjoying a great and increasing popularity. It is employed either to furnish a pedal sâ and pa as drone accompaniment, or to follow the voice in a varying degree of approximation in a kind of discordant scramble. For the drone, Moore's harmonium gives more scope in pitch, and far better results, as the fifths are in tune. The latter kind of accompaniment has nothing to recommend it according to Western taste; whatever virtue it may appear to possess may be obtained with the addition of accuracy from Moore's harmonium, but subject to a certain limitation with respect to key. There are possibilities in the way of harmony, but for the present the great object which the inventors have in view is to educate public taste and preserve the Indian scales. For the class-room the instrument should prove indispensable, and amateurs, who can afford to purchase an instrument, will find it of great service in enlarging their acquaintance with the Indian Râgas. The value of the instrument for scientific research cannot be overestimated; without its help it is no exaggeration to say that the tabulation and systematic classification of the Râgas is likely to remain impossible of achievement.

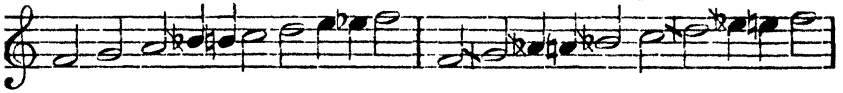
In the method recommended for such an inquiry, as already stated, the first step would be to classify the Râgas according to the scales they employ, in groups arranged so as to distinguish the important features of Indian intonation. The main groups will be (1) Grâma scales, (2) Chromatic scales, (3) Irregular scales, (4) Mixed scales. Until a comprehensive list of Râgas with their scales and distinguishing characteristics is made, one can only throw out rough suggestions as to the sub-heads into which each group should be divided. With regard to the Grâma scales, the author is not in favour of the system adopted by European writers in treating of similar dialectical scales, nor is the method familiar or likely to be acceptable to Indian musicians. The system alluded to is that of dissecting scales into tetrachords (*i.e.* groups of four notes) and naming modes after their Greek prototypes. This method is not really in accordance with any natural process in the evolution of scales, and in some cases is calculated to mislead one as to the origin of Indian scales. Neither does it sufficiently accentuate differences of intonation, which are the life and soul of music. The method may serve some purpose in further classification of the Râgas included under each sub-head. But at present one cannot do better than follow the principles adopted by Mr. Bhatkhande in his "Hindustani Sangitâchi Paddhati." Mr. Bhatkhande takes the scales of certain Râgas as typical "thâts" or "arrays" of notes, and allows a certain amount of latitude in respect of chromatic change among the scales assembled under each "thât." His "thâts" are (1) Kalyân, (2) Bilâval, (3) Khamâj, (4) Kâfi, (5) Asâvari, (6) Bahiravi, (7) Bhairava, (8) Todi, (9) Purvi, (10) Mârvâ. Under the first head he includes such scales as Yaman, and scales which, like Kalyân itself, take two madhyams, tivra and komal. Under the second he includes some scales with the high sixth, and some which take two nishâds, komal or kaishik and tivra. With a little more attention to correct intonation, his classification will be the most convenient, and is likely to prove the most acceptable to the Indian musician. The following are suggested as typical Grâma scales: the black notes show what chromatic changes are permissible. Each type, speaking generally,

**Suggestions as to the classification of the Râgas.**

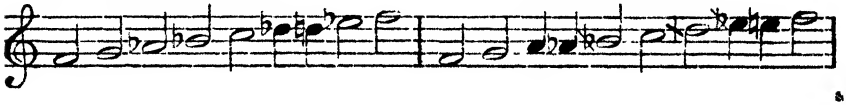
includes scales which (1) in part use the secondary notes in preference to the corresponding primary ones, or (2) in whole or in part make use of both primary and secondary as alternatives, or (3) use the primary notes exclusively. The primary notes are given first, and the corresponding secondary notes are placed immediately after them. The word "primary" is intended to convey the sense of original, and "secondary" that of altered, or "vikrit," to use the ancient term.[1]

SHADJ GRÂMA.

I. The Kalyân or Bihâg type. II. The Kâfi type.
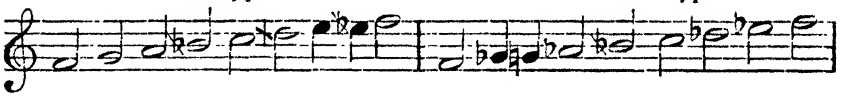


III. The Dhâni type. IV. The Khamâj type.

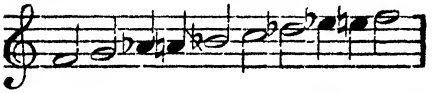


MADHYAM GRÂMA.

V. The Bilâval type. VI. The Bahiravi type.



VII. The Âsâvari type.



It is necessary to add the following explanations.

Types IV. and V., and types VI. and VII., to a certain extent, overlap; it will never be doubtful, however, in practice to which group any particular scale belongs. The main difference between these kindred groups is one of tonality. No scale resembling types VI. or VII., which includes dha ♭ and ni ♮ without the occasional use of ni ♭, should be included under those types. Such scales should be put in one of the groups of Chromatic Scales. An interesting scale which makes use of all the nine notes comprised in Scale VII. is

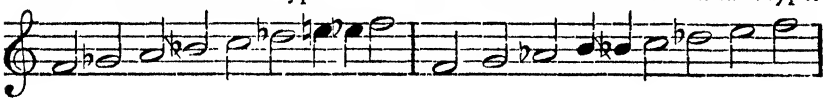
[1] In European music, the same sort of distinction is expressed by the words "diatonic" and "chromatic." These terms, however, are not altogether appropriate here.

that of Râga Lâchâri. Some singers restrict the name "Âsâvari" to the Râga, which takes the septimal notes ri ♭ and dha ♭, and call the scale comprising the primary notes of VII. Jivanpuri. Others call the septimal Râga "Râmkali Âsâvari." The latter variety should be classed among the Irregular Râgas.

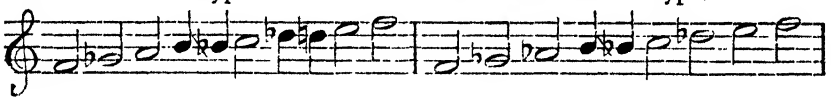
The following grouping is suggested for the Chromatic Scales :—

CHROMATIC GENUS.

VIII. The Bhairava type. IX. The Deshi Todi or Kândra type.



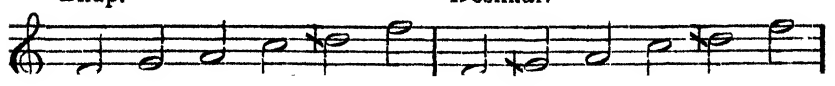
X. The Purvi type. XI. The Multâni type.



Irregular scales will include such divergent types as Yaman-Kalyân and Mârvâ. Until a list of them is prepared, it is impossible to put forward any definite plan for their classification. It may be possible to regard them as off-shoots of the typical Grâma-scales, or Chromatic Scales. Râga-scales, which are obviously compounded of two or more dissimilar types, will come under the head of Mixed Scales. The number of Râgas possessing mixed scales will be found to be considerable.

The above suggestions are meant to be of a tentative nature. A fuller acquaintance with the Indian Râgas than the author possesses may reveal defects in the grouping suggested, or lead to the formation of other groups. The main object of the above classification is to accentuate such differences as those between dha ♮ and dha ♮, ri ♮ and ri ♮, ga ♭ and ga ♮, and so on. To exemplify this feature of the proposed method, the scales of Bhup and Deshkâr may be quoted. They are as follows :—

Bhup. Deshkâr.

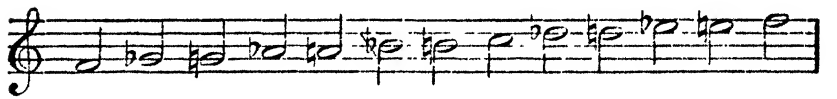


They will be included, the former under Group V. and the latter under Group II.
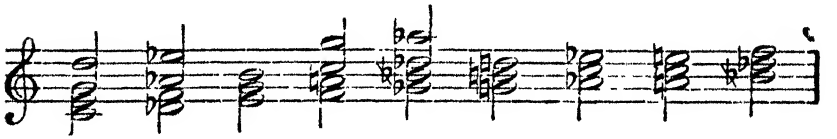
**How to adapt Western keyed instruments to Indian music.**

The last subject which the writer proposes to discuss is the feasibility of adapting Western keyed instruments, such as the instruments used in military bands, for the performance of Indian airs in correct intonation. The prevalent impression appears to be that it is impossible to render more than one or two Râgas in just tuning if one is confined to twelve notes in the octave. Those who take a fancy to European instruments argue therefrom that one is driven to have recourse to the tempered scale. The following typical scales have been drawn up in order to correct this misapprehension, and to show that the twelve notes of the European octave may be so tuned as to give a very great scope for the performance of Indian airs. It must be understood that purely instrumental music is contemplated where the question of pitch is not an essential consideration.
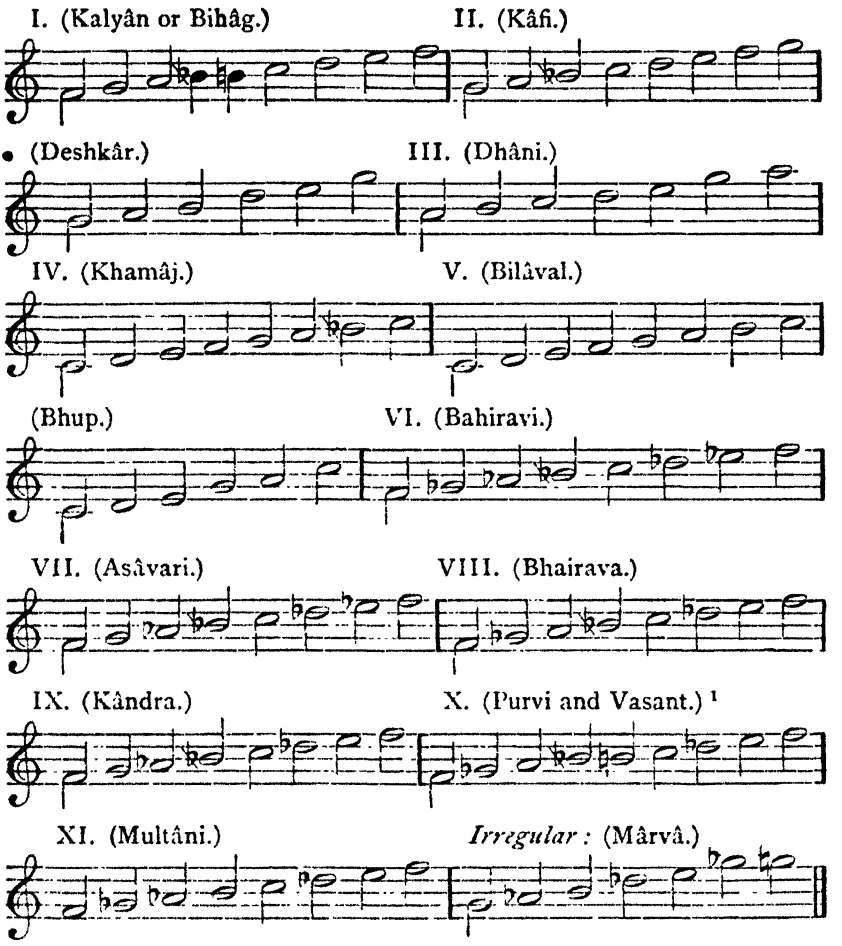
TUNING.



The notation is that followed throughout this volume. The naturals are in just tuning in key C; B ♮ is a fourth above F; G ♭ is a major third below B ♮, and the remaining flats are obtained from G ♭ by an ascending series of fifths. The concords available are—



The following typical scales may be correctly rendered :—




It would not be impossible to obtain a complete band of instruments tuned in the manner indicated. The drone is shown in the same way as in previous chapters; four sets of instruments of percussion would seem to be required. As regards pitch, it would probably be found convenient to substitute E ♭ for F.

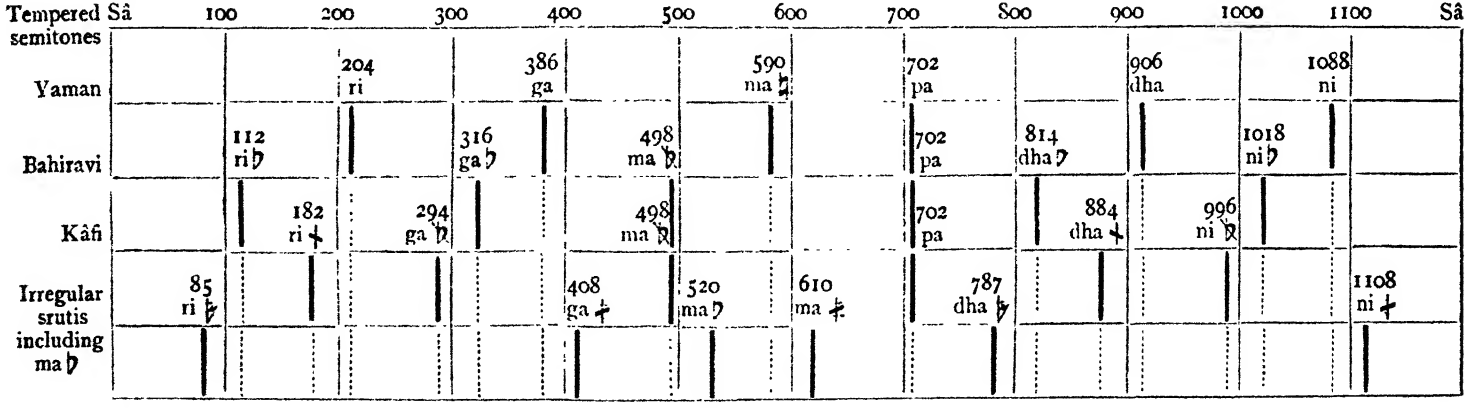
Indian music opens up a new world to the student of harmony. Where every chord is a little out of tune, as in equal temperament, the harshest discords may be tolerated; in just tuning, common chords are so pure that their admixture with the simplest discords must be managed with care and restraint.

[1] Vasant takes both mas; Purvi takes ma ♮ only.

# APPENDIX A

## THE INDIAN SRUTIS AND THE TEMPERED CHROMATIC SCALE

COMPARED BY MEANS OF "CENTS."[1]

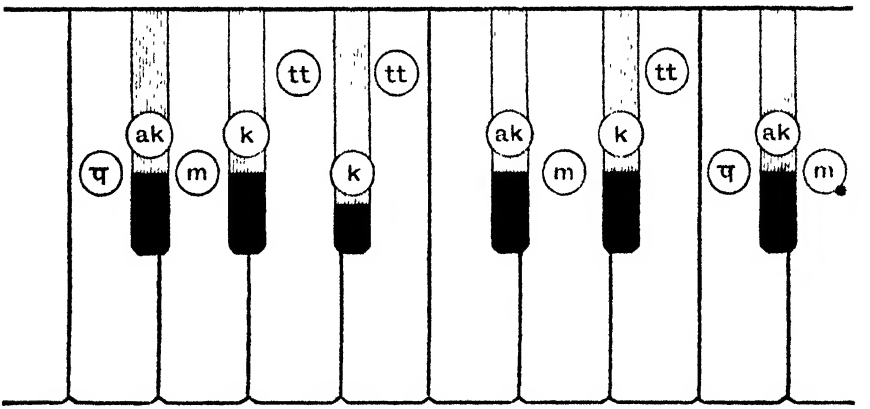



[1] A "cent" is the interval $2^{\frac{1}{1200}}$; one hundred cents make the interval $2^{\frac{1}{12}}$, which is the tempered semitone. 112 make the just semitone, 182 the minor tone, 204 the major tone, and so on, as the diagram shows.

# APPENDIX B

## THE INDIAN HARMONIUM
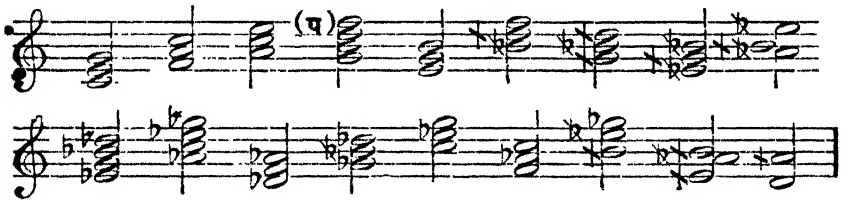
THE keyboard of the Indian harmonium is constructed as follows:—




The white keys consist of sâ and pa shuddh and the rest tivra. The five black notes are: ri komal, ga sâdhâran, ma kaishik, dha komal, ni kaishik. The notation sign for all the white notes is ♮ and for all the black notes ♭. The remaining srutis are sounded by pressing upon brass studs. The front studs marked "m" are the madhya notes ri and dha (♯). The stud marked "प" is for atikomal madhyam (𝄫) in pancham key (*i.e.* for voices which find pa a more convenient starting point than sâ). The middle row of studs includes the notes which are one sruti less than the black notes. They are marked "ak" in the case of the septimal notes atikomal ri and dha, and "k" in the case of komal ga, ma, and ni. The principal one, ma komal, is for convenience placed in advance of the others. The signs for them are 𝄫 and 𝄪 respectively. The back row of studs consist of the tartivra notes ga, ma, ni. They are marked "tt," and their sign is 𝄪.

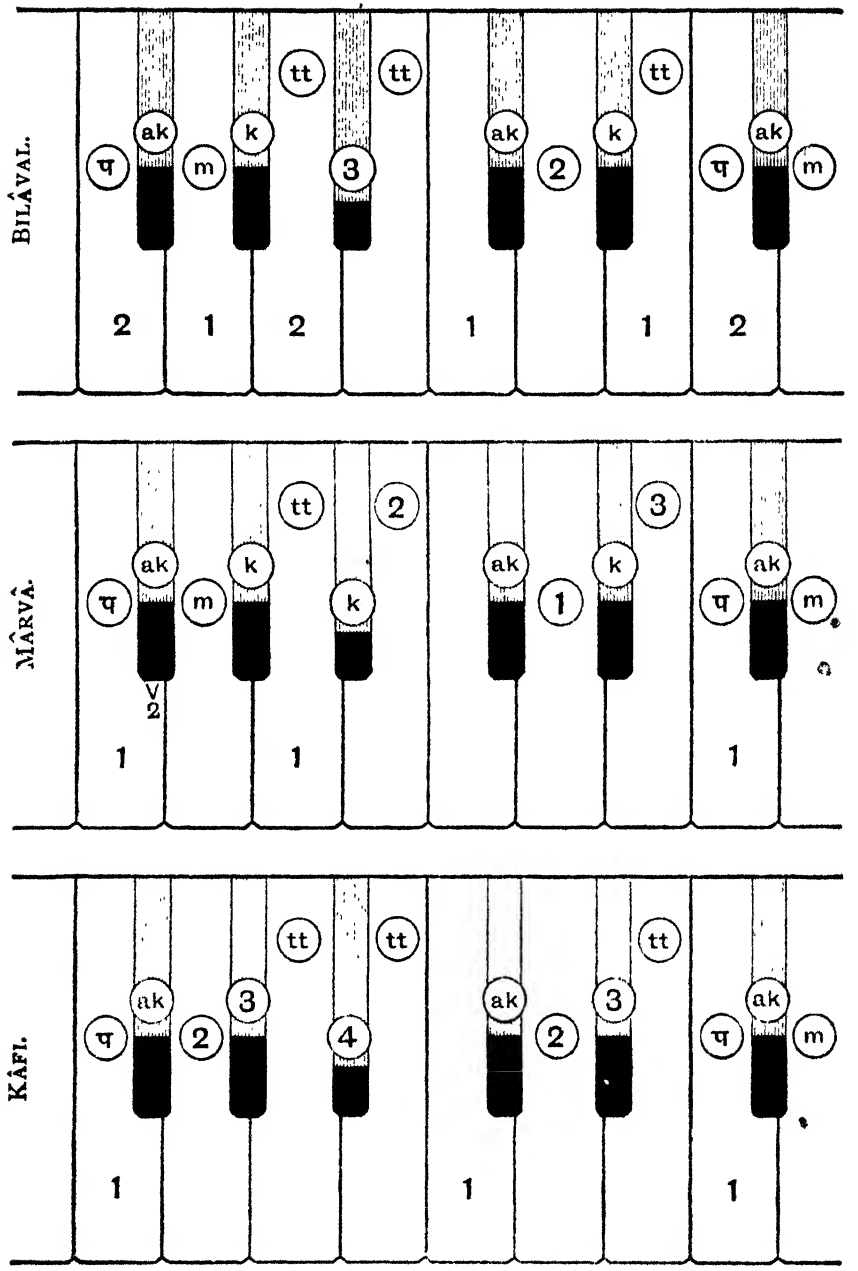
The harmonium is tuned from pa, the octave above the middle C of the great staff. The method of tuning will be clear from the

following chords which give an harmonious combined sound without sensible beats. Beats consist of a periodical increase and decrease in the volume of sound. When notes which should form harmony are not in tune, beats are heard; the further the notes are from true concord, the quicker the beats, until they become so rapid that the mind, unable to follow them, receives the sensation of roughness or harshness. When the notes are very near to their correct pitch, beats may become so slow that what is heard is a roughness recurring at regular intervals of time. The reader who has access to an Indian harmonium may study the question of beats by sounding together ri tivra and ri madhya, first in the lowest octave and then in each succeeding octave. He will notice that a discordant interval in one octave gives exactly double the number of beats which the same interval gives in the octave below. If he plays the nearest equivalents to the concords here shown on a tempered harmonium, he will find that, with the exception of the octave, all intervals give beats more or less rapid.

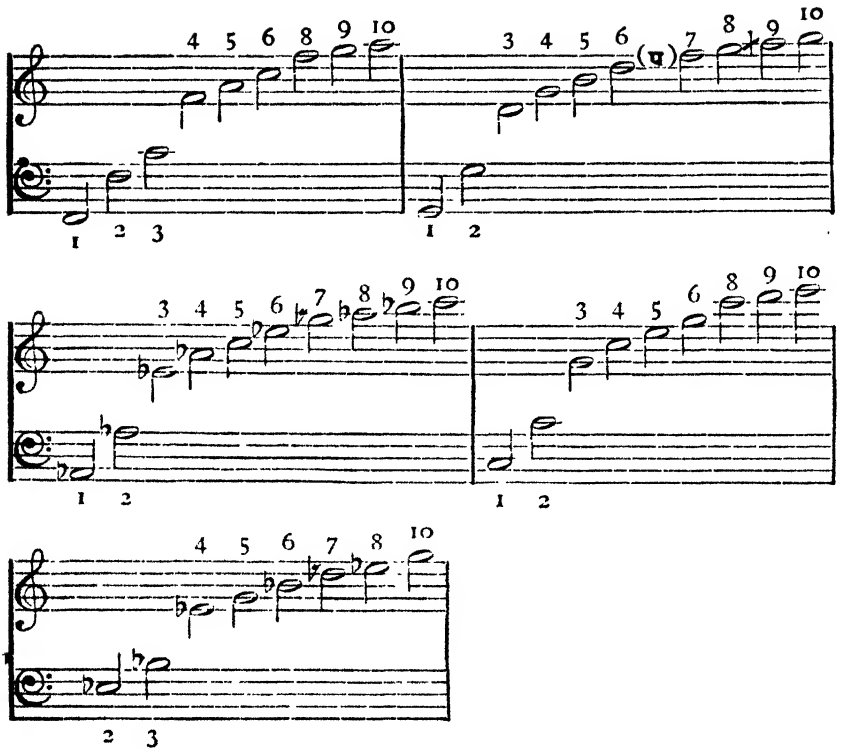


The "pitch C" is the C an octave above the middle C. This note is tuned from a tuning fork to 522 vibrations a second. This is the London Philharmonic pitch as settled in the year 1896, and for all practical purposes the French diapason normale at a temperature of 60° Fahrenheit. Thus the sâ of the madhya octave (man's voice) is of 174 vibrations.

Three of the scales given in the text are graphically shown below as played on the Indian harmonium. To assist the beginner, the best method of fingering is shown by figures. 1 stands for the thumb, 5 for the little finger, and the other numbers for the remaining fingers in order.
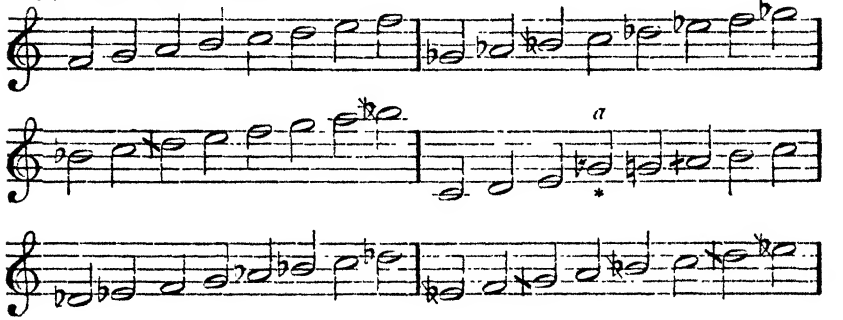



The scope afforded by the Indian harmonium for demonstrating the nature of the harmonic series is clear from the following. The terms of the series given above each of the generators are numbered.
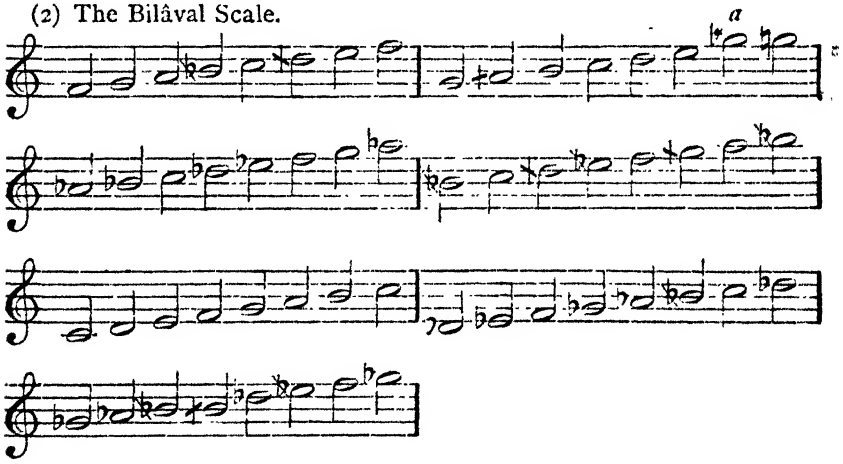


# APPENDIX C

## TRANSPOSITION ON THE INDIAN HARMONIUM

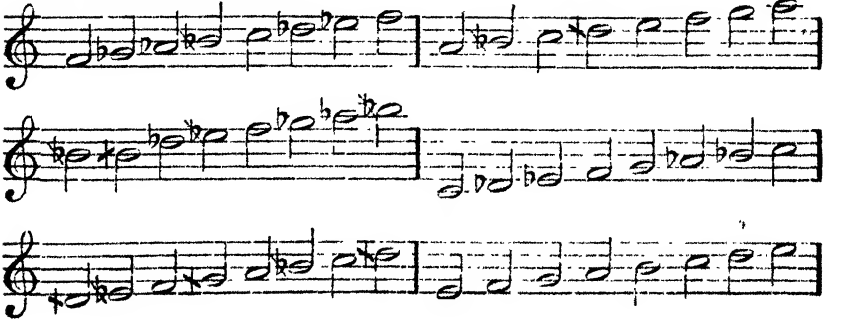
(1) The Yaman Scale.
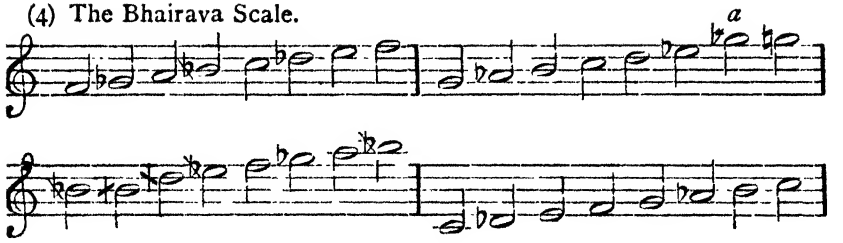


(2) The Bilâval Scale.



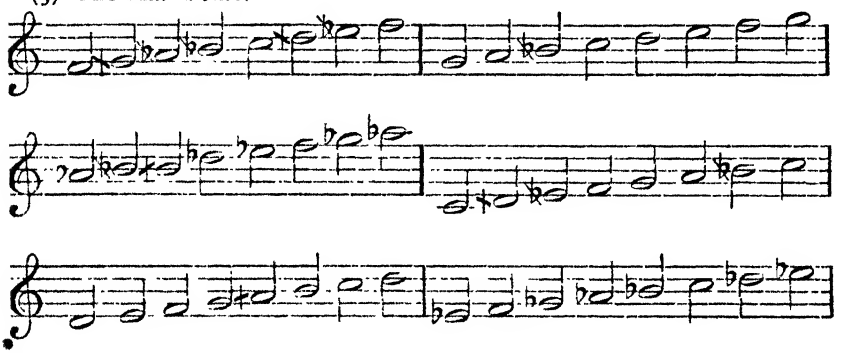
(3) The Bahiravi Scale.
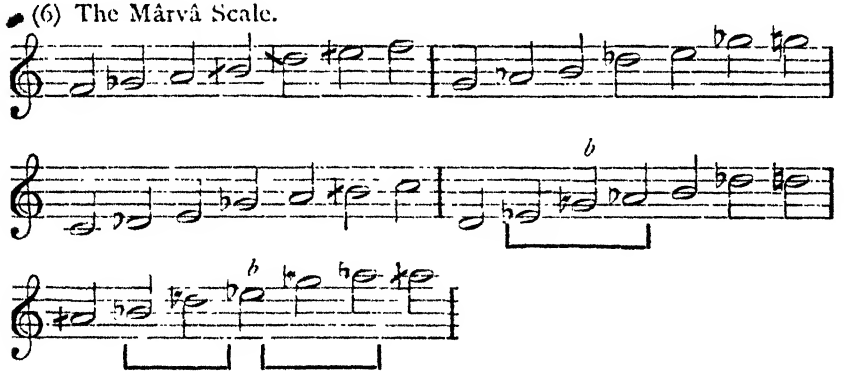


(4) The Bhairava Scale.



(5) The Kâfi Scale.



(6) The Mârvâ Scale.



(*a*) This note is approximate only.

* The Râga Yaman-Kalyân makes use of the Septimal 4th (ma ♭). In this key the exact note is given by the F stud marked (♮).

(*b*) The progressions bracketed are the septimal ones to which the scale approximates. See p. 31.

NOTE.—The resources of the instrument for transposing would be enormously increased if the key marked ♮ were tuned one sruti higher than shadj, the key which it pierces. It would then be "kaishik ma" in key pancham instead of "atikomal ma" as at present. The Râga Yaman-Kalyân which takes two ma's, tivra and

atikomal, could be rendered in two keys, namely dha ♭ and ga ♭. At present it can only be correctly rendered in one (dha ♭ being taken as shadj). This change in tuning is easily effected. The instrument would thereby lose something in the way of harmonic possibilities.

# APPENDIX D

SÂRIGAMS of Jâtis and Grâma-Râgas discussed in the Text. These are taken from Ratnâkar. A dot means a note in the low octave, a dash one in the high octave.

## SHADJ-KAISHIKI (8).

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| sa | sa | ma· | pa· | ga ri | ma ga | ma | ma |
| ma | ma | ma | ma | sâ· | sâ· | sâ· | sâ· |
| dha | dha | pa | pa | dha | dha | ri | ri ma |
| ri | ri | ni· | ni· | ni· | ni· | ni· | ni· |
| dha | dha | pa | dha ni | ma | ma | pa | pa |
| dha | dha | pa | dha ni | dha | dha | pa | pa |
| sâ | sâ | sâ | sâ | sâ | sâ | sâ | sâ |
| dha | dha | pa | dha | dha ni | dha | dha | dha |
| sâ | sâ | sâ | ri ga | sâ | ri ga | dha | dha |
| ma | dha | pa | pa | dha | dha | ni | ni |
| ri | ri | ga | sâ | sâ· | sâ· | sâ· | gâ· |
| dha· | ri· sâ | ri· | sa· ri· | ri· | sâ· | sâ· | sâ· |
| sâ | sâ ri | ri | sâ ri | ri | sâ | sâ | sâ |
| ma | ma | ma | ma | ni dha | pa dha | ma | ma |
| ni | ni | pa | pa ma | pa | pa ma | pa dha | ri ga |
| ga | ga | ga | ga | ga | ga | ga | ga |

## SHADJODICHYAVA (9).

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| sa | sa | sâ | sâ | ma· | ma | ga· | ga· |
| ga | ma | pa | ma | ga | ma | ma | dha |
| sâ | sâ | ma | ga | pa | pa | ni | dha |
| dha | ni | sâ | sâ | dha | ni | pa | ma |
| ga· | sâ | sâ | sa | sâ | sâ | sâ | ga· |
| dha | dha | pa | dha | pa | ni | dha | dha |
| sâ | ga· | ga· | ga· | ga· | ga· | sâ | sâ |
| ni· | dha | pa | dha | pa | dha | dha | dha |
| sâ' | sâ' | ma | ga | pa | pa | ni | dha |
| dha | ni | sâ' | sâ' | dha | ni | pa | ma |
| ga· | sâ | sâ | sâ | sâ | sâ | sâ | ga· |
| dha | dha | pa | dha | ma' | ma' | ma' | ma' |

## KAISHIKI (13).

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| pa | dha ni | pa | dha ni | ga | ga | ga | ga |
| pa | pa | ma | ni dha | ni dha | pa | pa | pa |
| dha | ni | sâ' | sâ | ri | ri | ri | ri |
| sâ | sâ | sâ | ri | ga | ma | ma | ma |
| ma' | dha' | ni' | dha' | ma' | dha' | ma' | pa' |
| ga | ri | sâ | dha ni | ri | ri | ri | ri |
| ga | ri | sâ | sâ | dha | dha | ma | ma |
| ga | ga | ga | ma | ma | ni, dha, ni | ni | ni |
| ga | ga | ni | ni | ga | ga | ga | ga |
| ga' | ga' | ni' | ni' | ni' dha' | pa' | pa' | pa' |
| ma' | pa' | ma' | pa' | pa' | pa' | ma' | ma' |
| sâ' | ma' | ga' | ni' dha' ni' | ni' | ni' | ma' | ga' |

## GRÀMA-RAGA SHUDDH-SADHARIT (1).

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| sâ | sâ | dha | ni | pa | pa | pa | pa |
| dha | dha | ni | ni | ri' | ri' | pa | pa |
| ri | pa | pa | pa | dha | ni | pa | ma |
| dha | ma | dha | sâ | sâ | sâ | sâ | sâ |
| dha | dha | sâ | dha | sâ | ri | ga | sâ |
| ri | ga | pa | pa | pa | pa | pa | pa |
| dha | ma | dha | ma | sâ | sâ | sâ | sâ |
| pa | dha | ni dha | pa | ma | pa | ma | ma |

## SHUDDH-SHADAVA (19).

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| ma' | ma' | dha' | dha' | sâ | dha | ni | pa |
| dha | ni' | ma' | ma' | ma' | ri | ma' | ri |
| dha' | ni' | sâ' | sâ' | ga | ri ga | dha | dha |
| sâ | dha | sâ | ma ga | ma' | ma' | ma' | ma' |
| ma ga | ri | ga | ma | ma | ma | pa ma | ga |
| ri | ga | sâ' | sâ' | ma' | ma' | ma' | ma' |
| ni | dha' | ni | dha' | sâ' | sâ' | sâ' | sâ |
| ga | ri | ri | ga | ma' | ma' | ma' | ma' |

## TAKKA (23).

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| sâ | sâ | dha | dha | ma | ma | ma | ma |
| sâ | sâ ni | dha | sâ | sâ | sâ | sâ | sâ |
| sâ | sâ | ga | ga | sâ | ma | ga | ma |
| dha | sâ | ni dha | sâ | sâ | sâ | sâ | sâ |
| dha | ni | sâ | ga | ma | dha | ma | ga |
| sâ | sâ | dha | ni | sâ ni | dha | dha | dha |
| sâ | sâ | pa | ni | ma | ga | ma | ga |
| ga | ga | dha | ni | sâ | sâ | sâ | sâ |

## REVAGUPTA (26).

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| ni | dha | pa | pa | ni | ni | ni | ni |
| sâ | ni | sâ | ri | ri | ri | ri | ri |
| sâ | ga | ri | ri | ma | ga | ri | ri |
| ga | ri | sâ | sâ | ni | sâ | ni | ni |
| ma' | ma' | ga' | ga' | pa | pa | ni | dha |
| pa | ma | ga | ri | ga | ri | sâ | ni |
| sâ | sâ | ri | ni | sâ | ni | sâ | ri |
| ga | ri | ga | ma ga | ma | ma | ma | ma |

## GANDHARA-PANCHAM (27).

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| sâ | ni | sâ | ga | sâ | ga | ga | ga |
| ma | pa | ma | pa | ga | ga | ga | ga |
| ga | pa | sâ | ga | ga | ga | ga | ga ni |
| ni | pa | ma | pa ma | ga | ga | ga | ga |
| ga | ga | ga | ga ni | ni | ni | ni | ni sâ |
| ni | pa | ma | pa ma | ga | ga | ga | ga |
| ma | pa | sâ | ga | ga | ga | ma | ga ni |
| ni | pa | ma | pa ma | ga | ga | ga | ga |

## KUKUBH (28).

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| dha | dha | sâ | sâ | dha | dha | ri | ri |
| dha | dha | dha | dha | pa | dha | pa | ma |
| ri | ri | ma | ma | pa | dha | pa | ma |
| pa | dha | pa | ma | ma | ma | ma | ma |
| ri | ri | ma | ma | dha | dha | pa | ma |
| pa | ma | pa | pa | dha | dha | pa | ma |
| pa | dha | pa | ma | sâ | ri | sâ | ri |
| ga | sâ | pa | pa | pa | pa | pa | pa |

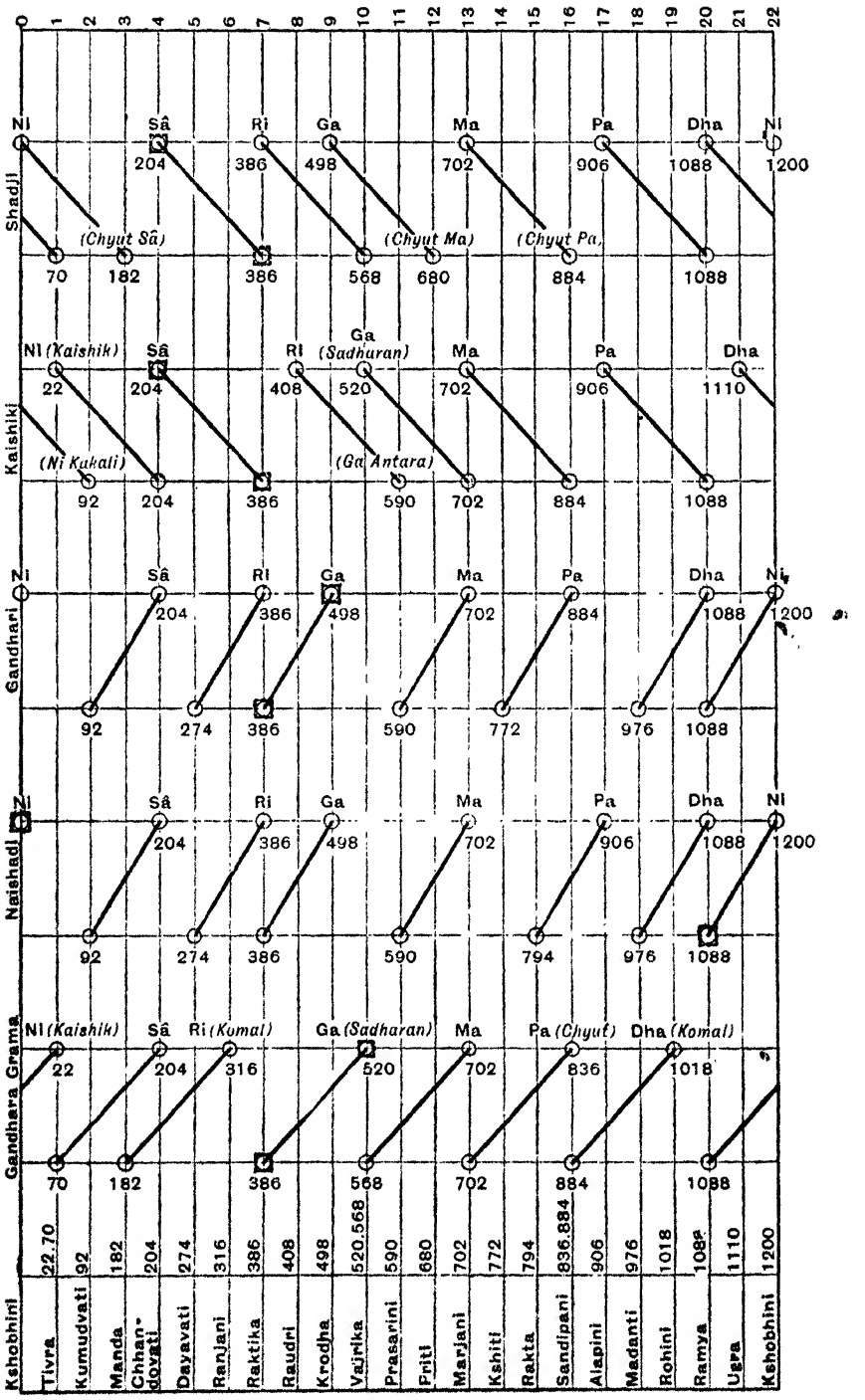
## SHUDDH-PANCHAM (30).

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| sâ· | sâ· | sâ· | sâ· | ri· | ri· | ga· | sâ· |
| ma | ga | pa ma | ga | ri· | ri· | ri· | ri· |
| ma· | sâ· | sâ· | sâ· | ri· | ri· | ga· | sâ· |
| ma | ga· | pa ma | ga | ri· | ri· | ri· | ri· |
| ri· | ri· | ma· | ma· | pa | pa | dha | ma |
| ma | dha | sâ· | sâ· | ni | dha | pa | pa |
| dha· | ni· | ri· | ma· | ri· | ma· | pa | pa |
| dha | ma· | dha | ni· | pa | pa | pa | pa |

## TAKKA-KAISHIK (31).

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| dha | dha | dha | dha | dha | ma | pa | pa |
| dha | dha | ri | ga | sâ· | sâ· | ri | ga |
| dha· | dha· | ma· | dha | dha· | dha· | dha· | dha· |
| ma· | dha· | ma· | dha· | dha· | dha· | dha· | dha· |
| dha· | dha· | sâ· | sâ· | ga | ri | ma | ma |
| ri | ri | ma | ma | dha | ri | ma | ma |
| dha | dha | dha | dha | dha | dha | dha | sâ |
| dha | pa· | ma | dha | dha | dha | dha | dha |

# APPENDIX E


0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22
Shadjl
Ni Sâ Ri Ga Ma Pa Dha Ni
204 386 498 702 906 1088 1200
(Chyut Sâ) (Chyut Ma) (Chyut Pa)
70 182 386 568 680 884 1088
Kaishiki
Ni (Kaishik) Sâ Ri Ga (Sadharan) Ma Pa Dha
22 204 408 520 702 906 1110
(Ni Kakali) (Ga Antara)
92 204 386 590 702 884 1088
Gandhari
Ni Sâ Ri Ga Ma Pa Dha Ni
204 386 498 702 884 1088 1200
92 274 386 590 772 976 1088
Naishadi
Ni Sâ Ri Ga Ma Pa Dha Ni
204 386 498 702 906 1088 1200
92 274 386 590 794 976 1088
Gandhara Grama
Ni (Kaishik) Sâ Ri (Komal) Ga (Sadharan) Ma Pa (Chyut) Dha (Komal)
22 204 316 520 702 836 1018
70 182 386 568 702 884 1088
Kshobhini
Tivra 22.70
Kumudvati 92
Manda 182
Chhandovati 204
Dayavati 274
Ranjani 316
Raktika 386
Raudri 408
Krodha 498
Vajrika 520.568
Prasarini 590
Priti 680
Marjani 702
Kshiti 772
Rakta 794
Sandipani 836.884
Alapini 906
Madanti 976
Rohini 1018
Ramya 1088
Ugra 1110
Kshobhini 1200

THE table shows at a glance the twenty-two srutis of Ratnâkar, and how they were used in the Grâmas and Jâtis. The octave is shown divided into twenty-two equal parts in order to expose graphically the fallacy of Bharata's theories. Shâdji is first given with the "shuddh svaras" (pure notes) and then as usually played from ri with Grâma-Sâdhâran. In the Kaishik scale, ri, ga, dha, ni are a hair's breadth (one sruti or 22 cents) higher. That scale also is shown as played from ri. Gândhâri and Naishâdi were played by lowering the speaking-wire by a semitone, the former actually starting from ri and the latter from dhaivat, although the frets used were those of ga and ni respectively. The Gândhâra-Grâma is shown, first from ga sâdhâran as laid down in Ratnâkar, and secondly as played from ri. The sign  distinguishes the "Graha Svara" or initial note. The object of arranging the Jâtis, etc., so as to begin from ri or dha was to obtain the appropriate drone on the tambura, which was tuned in ancient times to those notes. Naishâdi and Dhaivati may also have been played from ri like the others using the scale noted by Bharata in which dha is komal, and the rest of the svaras shuddh, and in the case of Naishâdi lowering the speaking-wire a semitone.

The fallacy underlying the theory of the equality of the srutis is demonstrated by the numbers given. They are calculated on the basis that a one-sruti interval is 22 cents, two srutis 112, three srutis 182, and four srutis 204. The 3 sruti interval of the Gândhâra Grâma is 134 as explained in the text. It will be seen that the ancient system required 25 srutis, and not 22, three of them being confounded with their neighbours.

# INDEX AND GLOSSARY


Cents. A means of measuring intervals, 34.

Deval. Mr. Deval's researches, 6.

Drone. Indian music is played with a drone or pedal accompaniment. The "tambura" is the stringed instrument used for the purpose to accompany the voice. Latterly, theatrical companies have introduced the practice of holding down two notes on the harmonium. Solo instruments have "chanterelle" strings, which add a drone to the melody, 3, 47, 63, 73.

Grâma. The material from which scales and modes are obtained. The chief element of its connotation was a certain order of intervals. Fixity of pitch of the notes forming the intervals was originally another element. See pages 2, 22, 50, 56, 72.

Grâma-Râga, 3, 63, 72.

Harmonium, the Indian, 7, 10, 20, 82, and Appendices B, C.

Instruments, tuning of keyed, to adapt them to Indian Music, 86.

Jâti, the nearest equivalent to the European "Mode," 3, 23, 53, 61; Shuddh Jâtis, 23, 61; Vikrit Jâtis, 61, 71.

Kaishik, 9, 54, 60.

Modes, the Church, 61.

A Murchhana was a Scale beginning with the lowest note permissible in any given melody-type and ending on the note on octave above. The scale of a Jâti is best rendered by taking the "Graha-Svara" as the starting-point. In the author's opinion the "Graha-svara" (initial note of a composition) formed part of the drone. The difference between the Authentic and Plagal Modes of Europe (page 62) would, in Indian phraseology, be partly explained by the difference of Murchhana. See pages 3, 51, 58. The modern Indian method is to sing all scales from shadj as a starting-point. The word Murchhana has fallen into disuse and is frequently misunderstood.

Notation, Chapters II and III; Accidental, 43; the Great Staff, 16; Pianoforte Score, 19; Indian Measures, 41; embellishments, 45.

Pitch of Indian Music, 20, 55.

Râga. Explained, 3. Various modern Hindustani Râgas are mentioned on pages 11–14, 24–32, 84–87.

Râga-Vibodh, 80.

Sâdhâran, 55–59.

Saptaks, the three. Music written for any voice is confined to three octaves or "saptaks," the "târ saptak" (the highest octave), the "madhya saptak" (the middle octave), the "mandra saptak" (the lowest octave), 16.

Scale. Explained, 21; earliest scales, 78; Sampurna, Shâdava, Odava, 30, 51; the tempered scale, 33–36; the Madras shuddh scale, 81; Grâma scales, 29; Chromatic scales, 30.

Septimal intervals, 13, 19, 31–33.
Shuddh and Vikrit, 5, 54, 61.
Sound, theory of, 15–18; upper partial tones, 16, 18, Appendix B; beats, 91.
Srutis, the twenty-two, 5, 6, 53, Appendix E. The srutis are primarily the intervals into which the octave is divided by the sum-total of the notes in use. The ancients held the erroneous opinion that these intervals were equal. Their system was, however, a convenient one for distinguishing between the major-tone (four srutis), the minor-tone (three srutis), and semitone (two srutis). By an interval of "one sruti," they understood the "comma" ($\frac{81}{80}$), 24.
Svara. A note of a scale, or more properly a "tone," 15; names of the Indian "svaras," 2.
Svaramela Kalânidhi, 80.
Tân, 59.
Text-books, confusion of existing, 48, 74, 81.
Tuning, ancient method of, 47, 63–72.
Vâdi, Samvâdi, 49, 55, 63.

THE END

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